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APRIL 1960



# airlift

WORLD AIR TRANSPORTATION

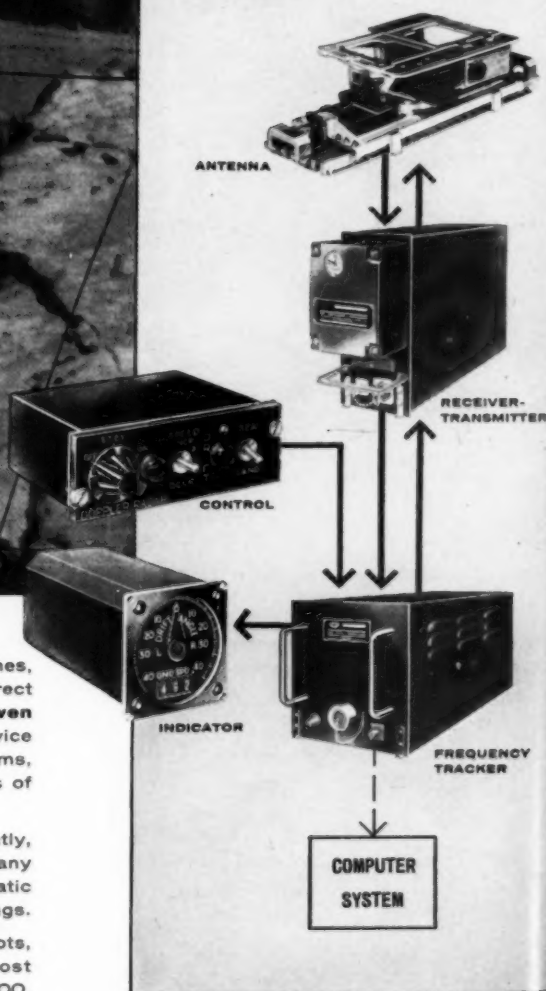
In This Issue:

- CAPACITY GROWS, GROWS, GROWS
- TRAINING FOR THE LOW APPROACH
- HIDDEN PROFITS IN MAINTENANCE

# Reliable RADAN 500

**GPL**'s new commercial Doppler system

## RADAN® 500 DOPPLER RADAR



**RADAN 500** Doppler radar, GPL's all new ARINC system for airlines, offers the reliability and longevity of service that only 13 years of direct Doppler experience can insure...reliability resulting from **flight-proven** designs based on 10 years of product improvement programs, service feedback on more than 1,500 operational GPL Doppler systems, and special attention to the design and maintenance philosophies of commercial airlines.

**SELF-CONTAINED:** Ground speed and drift angle, displayed directly, continuously, and accurately — over the poles, over oceans, over any terrain, day or night, good weather or bad — provide a dramatic extension of airline capabilities and important operational savings.

**VERSATILE:** Outputs for navigation computers, flight directors, autopilots, remote indicators, and attachments. Write to the world's most experienced Doppler manufacturer for further details on RADAN 500.

## GPL DIVISION

PLEASANTVILLE, NEW YORK

## GENERAL PRECISION, INC.

OTHER DIVISIONS OF GENERAL PRECISION INC. — KEARFOTT-LIBRASCOPE-LINK

**"NO ICE TODAY...  
OR ANY DAY...  
FOR THIS LADY!"**

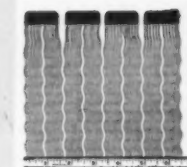
**GOODYEAR'S FAMOUS ICEGUARD STOPS ICE BEFORE IT FORMS**

Iceguard—the precious "ounce of prevention"—scotches icing hazards on the Boeing 707's empennage by efficient electrothermal action.

Nine separate Iceguards, tough electrically heated sheaths only "skin" thick, provide positive protection against dangerous ice accumulation. Operating on a fixed cycle at pilot's command, Iceguard heats up at once to shed ice. Goodyear's exclusive knitted heat element distributes heat efficiently to shed ice instantly and reliably.

Standard equipment on many of today's all-weather fighters and commercial jetliners, Iceguards are easily tailored to fit any area, any contour—large or small.

Where can you use tested and approved Iceguards? They're on the job now for propeller blades and spinners, jet engine intakes, air intake ducts, antennas, wing tips, leading edges—wherever ice-free areas are a must. Write for more facts to The Goodyear Tire & Rubber Company, Aviation Products Division, Dept. P-1735, Akron 16, Ohio.



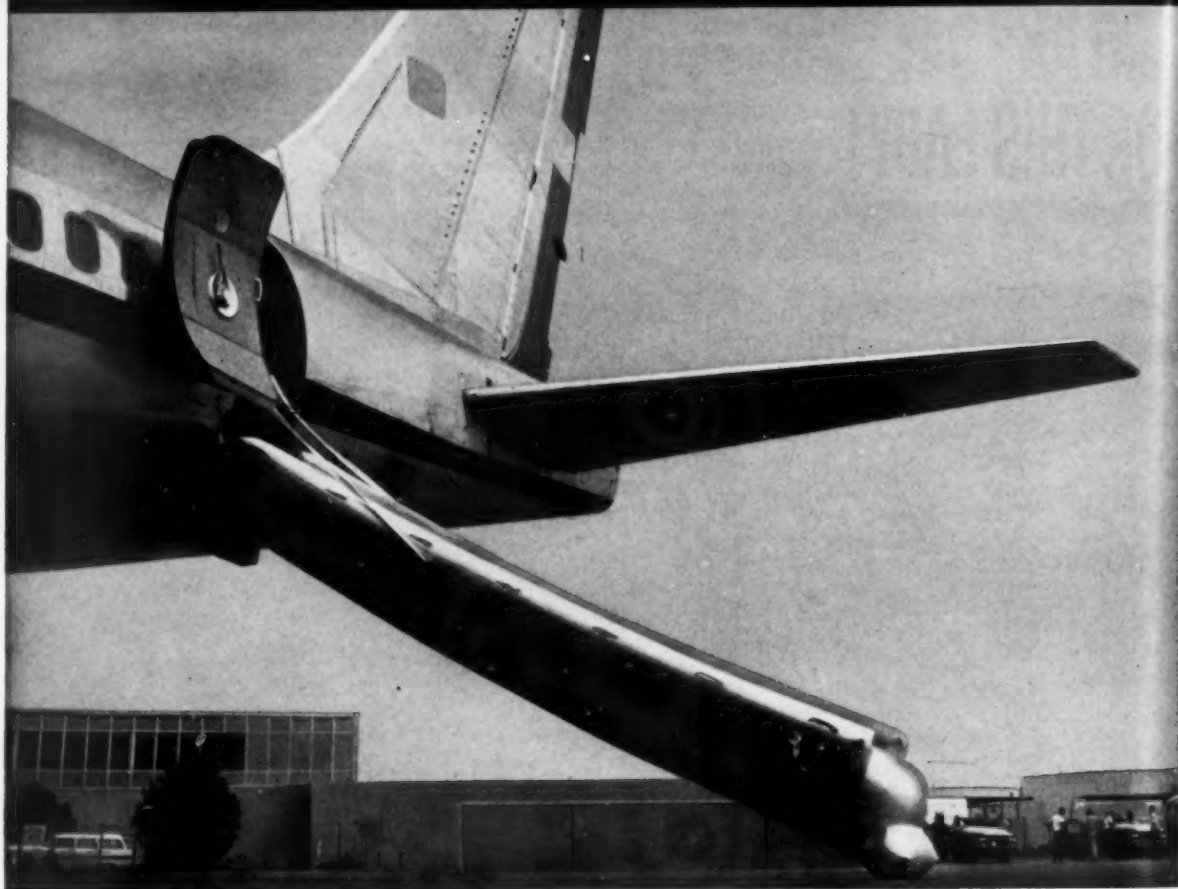
X-ray photo reveals Goodyear's strict quality control in manufacturing Iceguard. Unbroken heating wires are perfectly spaced for efficient action. Iceguard comes in two types: electrically conductive rubber and with knitted wire elements embedded in rubber.

lots of  
good things come from

**GOODYEAR**

**ESCAPE SLIDE**

another product of Air Cruisers research



## **DEPENDABLE SURVIVAL EQUIPMENT**

The Air Cruisers escape slide shown here assists passengers and crew to evacuate the aircraft in an emergency in a matter of seconds without injury. Simple to operate, it is standard equipment on most turbine-powered passenger aircraft.

Thoroughly tested by the military and commercial airlines, the inflatable escape slide is another major achievement in a field where Air Cruisers has been the leader for more than 30 years...dependable, lightweight survival equipment. The only manufacturer which con-

ducts continuous research in survival equipment, Air Cruisers is America's most experienced fabricator of inflatables from rubberized nylon materials.

The Air Cruisers jet pump, which produces the rapid inflation vital to the fast, dependable operation of the escape slide, is another contribution toward better survival equipment. Today, more products, including life rafts, deceleration bags, etc., are inflated by Air Cruisers jet pumps than by any other kind.

Your inquiries are invited.



## **AIR CRUISERS DIVISION**

BELMAR, NEW JERSEY



# airlift

WORLD AIR TRANSPORTATION

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**THIS MONTH'S COVER:** A rarity among jets, the Boeing 707-227, built solely for Braniff Airways, combines the small body of the 707-120 with the big engines (P&W JT4s) of the -320. Introduced by BNF in December, it is pictured at carrier's Dallas base. Approaching big jet at left is chief agent Jack Berndt. Ramp equipment includes AiResearch starter (in Volkswagen), Stewart and Stephenson power unit (center) and Texas Metal & Mfg. passenger stand. (Exclusive AIRLIFT photo).



## ...AND BRISTOL SIDDELEY

One of the largest manufacturers of motive power units in the world, Bristol Siddeley Engines Limited produce the Proteus.

A turboprop in the 4,000 hp class, the Proteus powers the Britannia airliner, in service with RAF Transport Command and twelve airlines all over the world. The Proteus is perhaps the most dependable engine in the air today. It reached an overhaul period of 2,000 hours in under two years

—a rate of increase never before achieved by any other engine, piston or gas turbine. *And Proteus engines have now logged more than 1,000,000 hours in the air!*

So sound is the basic design, that the engine is readily adaptable to a variety of applications and Proteus derivatives have been designed for use as turbo-generator powerplants and as marine turbines.

**BS** **BRISTOL SIDDELEY ENGINES LIMITED**

BRISTOL AERO-INDUSTRIES LIMITED, 200 INTERNATIONAL AVIATION BUILDING,  
MONTREAL 3, CANADA. TELEPHONE: UNIVERSITY 6-5471.



## ESUPPLY THE POWER

POWER FOR THIS



**Bristol Siddeley Maybach** diesel engines power Britain's fastest express train—the British Railways "Bristolian". Two Type MD 650 engines, developing a total of 2,200 hp, give the "Bristolian" a top speed of over 90 mph.

... AND THIS



**The Bristol Siddeley Gamma** rocket engine powers the Saunders-Roe Black Knight—Britain's highly successful space probe. Gamma sends Black Knight over 500 miles into space with unprecedented reliability.

... AND THIS



**The Bristol Siddeley Marine Proteus** powers the world's fastest naval vessels, the "Brave" class Royal Navy patrol boats, built by Vosper Ltd. Three Proteus deliver a total of 10,500 hp—give these 96-ft boats a speed of over 50 knots.

**LAKE CENTRAL AIRLINES orders**

**5 ALLISON**

*Prop-Jet*  
**SUPER CONVAIRS**



**to bring its passengers  
the fastest scheduled local  
service in America**

Lake Central Airlines starts its second decade of service in the Great Lakes-Ohio River Valley area by taking a giant step into the jet age—ordering five Allison Prop-Jet Super Convairst for delivery starting in late summer.

Lake Central's Board of Directors has also taken an option on 10 additional Prop-Jet Super Convairst from General Motors' Allison Division — which promises continued improvement in passenger service for years to come.

Allison Prop-Jet Super Convairst are standard 340/440 aircraft modified to use Allison 501 Prop-Jet Engines and Aero products Turbo-Propellers. In addition to conversion from piston engine to Prop-Jet power, the

modification program includes new nacelles and other airframe changes, which bring the aircraft up to thoroughly modern jet-age standards. The conversion work is performed for Allison by PacAero Engineering Corp., a subsidiary of Pacific Airmotive Corp., Santa Monica, Calif.

When these 350-m.p.h. airliners enter service, Lake Central will offer its passengers the fastest scheduled local airline service in America.

The line's passengers will travel in planes far quieter, more vibration-free and more comfortable than any piston-powered airliners serving any other local carrier.

And they'll ride in fully pressurized, completely air-conditioned 52-passenger aircraft that will get them to their local destinations far sooner, far more rested and relaxed than ever before.

An airline is as good as its service to passengers — and Lake Central is making certain its service is the best.



**ALLISON PROP-JET POWER**







## Fare Sense at Last

Believe it or not, the IATA traffic conference in Paris last month finally reached a conclusion which it could and should have met several years ago. As of July 1 there will be only two classes of service and fares on the North Atlantic. Not four, not three, but just two. Spring has indeed arrived.

Considering the completely cockeyed levels of fares and services which have been in effect for the past several years (although the so-called tourist class had virtually been abandoned), it is refreshing that the fare structure has been so beautifully simplified that even the traveling public can understand it. There will be first class, and there will be tourist (also called economy on occasions). No deluxe, no two low-fare classes.

Some of the wiser airline executives wanted this simple plan several years ago. IATA traffic conferences have spent fortunes arguing for weeks on end. And the solution was there right along, only to be found at this late date. But this is no time for mourning over the past. Commendation must go to all concerned for a new fare structure that means something.

## Those Late Schedule Changes

A theatre that didn't know until two days before an opening what seats were available for sale would find a lot of empties at the start of a run unless the show was an unusually popular hit.

Like a theatre seat, the airplane seat is highly perishable. But it represents a far more costly investment.

Customers and seats have eluded themselves for years through cumbersome reservations systems, blocked telephones, and other factors. But these links between customer and seat have improved vastly in the past few years.

One vital merchandising problem remains unsolved. This is advance scheduling.

As long as airlines exist there will be schedule changes. This, in itself, is a basic feature of any transportation media and is no handicap.

But if it is true that the average trip is planned two weeks ahead, then last-minute schedule changes lead to confusion and costly lost motion on the part of both customer and carrier. The instability of schedules has been a frustrating feature of air transportation, not so much because of the changes themselves but because of insufficient advance notice.

Lower echelons in the airlines have tried many times in many ways to conquer the problem. But the problem is too complex to be solved down the line. It is really a top management problem requiring a firm top management decision that advance seat merchandising is an extremely vital matter. Schedules should be made up ten days to two weeks

earlier than at present. Both customers and carriers would benefit. But only recognition by top management—and action thereby—will bring about a much-needed solution.

## Off the Cuff

**Pan Am's Smart Plan**—Anything that can reduce handling time and costs in air cargo is a forward step. We think Pan American World Airways is taking a giant step forward in its plan to make available to shippers aluminum containers which can be packed and sealed by the shippers and dispatched to their destinations intact by trucks, rail and air. Called the baggage-container system, the units are being built by Lockheed-Marietta. This is one idea that makes an enormous amount of sense.

**A Jack Frye Memorial**—We were mighty pleased to learn that the pilots of Trans World Airlines are setting up a foundation memorializing Jack Frye who was president of that airline until 1947 and who died only last year. Technical reference text books will be provided to various aeronautical engineering universities. An excellent means of remembering a man who contributed much to the air transport industry.

**Idea That Flopped**—With virtually no planning whatsoever, this year was designated "Visit U.S.A. 1960" by the President. So far as we can discover only a few airlines have endeavored on their own to promote business from abroad. The U.S. government appropriated no funds. There is no coordination of effort. In other words, the plan to bring tourists from overseas has been a colossal flop. It is time that such designations be forgotten unless this country can back up slogans with long-range planning. It takes more than a signature on a Congressional resolution to attract tourists.

**Can It Be True?**—Old-timers in Washington had to shake themselves to make sure they were reading correctly. The U.S. Department of Commerce sent to the President last month a report on federal transportation policies and programs. The report actually called for relaxing of governmental restrictions and regulations, especially in the area of fares. For a government report to recommend fewer restrictions is so startling that the heavens opened up and Washington had one of its heaviest snowfalls in years. We hope the CAB gives the report a thorough reading and takes the advice.

**Electra Problems**—Like all new airplanes, the Electra has been having teething problems. Thanks to a rational approach by FAA, the carriers and the builder, these problems will be resolved without rash and drastic actions. Let it be said in the highest commendation of FAA head Elwood Quesada that never in aviation history has such an airplane problem been handled more cautiously, wisely and sensibly.

Wayne W. Parish

LEADING  
WORLD AIRLINES  
HAVE ORDERED  
MORE  
JETLINERS  
FROM BOEING  
THAN FROM  
ANY OTHER  
MANUFACTURER

Total to date:

213



Up to April 1, Boeing had rolled out 127 jetliners, and delivered 106. In service, Boeing jetliners have flown 172,000 hours, and have carried more than 3,600,000 passengers... a record unequalled by any other jetliner.

**BOEING**

*These airlines are now operating Boeing jetliners: AIR FRANCE • AIR-INDIA • AMERICAN • B.O.A.C. • BRANIFF  
CONTINENTAL • LUFTHANSA • PAN AMERICAN • QANTAS • SABENA • TWA • Also MATS ■ IRISH • SOUTH AFRICAN • UNITED  
VARIG and WESTERN begin service soon ■ NATIONAL • NORTHEAST and PAKISTAN operate Boeing jetliners under lease.*

## On Quesada and ALPA

To the Editor:

I have meant for some time to write congratulations for your excellent editorial in the February issue of *AIRLIFT*. Since reading it I have talked with dozens of people, both in aviation and academic circles, and all agree that you put the matter well indeed. Not only did you point out areas where criticism is deserved, but you pointed to a constructive solution. Our congratulations.

KARL M. RUPPENTHAL  
Lecturer in Transportation  
and Management  
Stanford University  
Stanford, Calif.

## Boost for Supplementals

To the Editor:

Your story "Outlook for Supplementals—Prosperity Despite Jets," (*AIRLIFT*, March), is a marvelous presentation of the facts.

Everyone, including the CAB, FAA, MTMA, Certificated Trunkline Carriers and the General Public should know more of the facts regarding the Supplemental Industry.

I wish to thank you for the straightforward article which, through the medium of your magazine, will reach many people and I hope, give them a better understanding.

ROBERT C. GOODMAN, President  
All American Airways, Inc.  
Miami, Florida

To the Editor:

As an active member of the Supplemental Air Carrier Conference, I have

just read with great interest your article "Outlook for Supplementals—Prosperity Despite Jets."

I wish to express my gratitude for the fine job you have done in bringing before the industry an accurate account of our problems, successes and plans for the future.

DOUGLAS T. BELL, Pres.  
Associated Air Transport, Inc.  
Miami, Fla.

## Vote of Thanks

To the Editor:

We have just read your article on KHS Air Freight Service in the March issue.

We were most thrilled with the article and sincerely thank you for the recognition you have given us. The facts were so accurately stated and the comments given were as though we had been able to state the thoughts in our own minds.

MILDRED AND MENSER VANDENHEUVEL  
KHS Air Freight Service  
Battle Creek, Michigan

## Is your AIRLIFT late?

Your copy should be delivered to your office or home no later than the 10th of each month (for U.S. and Canada). Please wait until that date before telling us it has gone astray. If *AIRLIFT* comes after the 10th, please notify us so we can discuss the reason for late delivery with the Post Office Dept. Correspondence regarding late delivery should be addressed to Circulation Service Manager, *AIRLIFT*, 1001 Vermont Avenue, N.W., Washington 5, D.C.

## When & Where

### APRIL

April 5-7—AEEC meeting, Hotel Statler, Washington, D.C.  
April 5-8—SAE, national aeronautic meeting, Hotel Commodore, New York.  
April 8—Air Freight Forwarders Assn., annual meeting, Waldorf Astoria Hotel, New York.  
April 19-20—Air Cargo, Inc., contractors' advisory board, Washington, D.C.  
April 19-21—International Airline Navigators Council, 10th annual convention, Hotel Manhattan, New York City.  
April 19-24—International air and space exposition, Sports Arena, Hollywood, Calif.  
April 24-May 3—German Industries Fair, Aviation Show, Hanover Airport, Hanover.  
April 25-28—ATA, maintenance facilities subcommittee, Hyatt house, Burlingame, Calif.  
April 26-28—Airlines Electronic Maintenance Meeting, Hollywood-Roosevelt Hotel, Hollywood, Calif.  
April 26-28—ATA air traffic conference, Muehlebach Hotel, Kansas City, Mo.  
April 27-29—ATA interline communications committee meeting, Conrad Hilton Hotel, Chicago.  
April 28-29—Assn. of Local Transport Airlines, regional quarterly meeting, Warwick Hotel, Philadelphia, Pa.  
April 28-29—Aeronautical Training Society, 18th annual meeting, Mayflower Hotel, Washington, D.C.

### MAY

May 1-4—Aviation Writers Assn., annual meeting, Ambassador Hotel, Los Angeles.  
May 2—IATA, 13th Purchasing Committee, Lucerne.  
May 2-10—IATA, 13th annual technical conference, Lucerne.  
May 11-14—American Helicopter Society, annual national forum, Sheraton Park Hotel, Washington, D.C.  
May 16—Aviation Seminar, Queen Elizabeth Hotel, Montreal.  
May 17-19—ATA, purchasing committee meeting, Warwick Hotel, New York City.  
May 22-26—Airport Operators Council, annual meeting, Deschler-Hilton Hotel, Columbus, Ohio.  
May 29—Aviation Day, Philadelphia Int. Airport.

# A Flight Engineer's Sequel to 'Transcontinental Jet Flight Report'

To the Editor:

For some reason, the jet pilot who wrote "Transcontinental Jet Flight Report" was so engrossed in attempting to sell the importance and the spectacular role played by the third pilot that he failed to mention the required 3rd crew member, the flight engineer.

In respect to fair editing, I would like *AIRLIFT* to publish the required qualifications and duties of the flight engineer from the time he arrives at the airport until he departs the airport following a transcontinental flight of a TW 707.

F. A. ROWORTH  
16825 S.E. 3rd Place  
Bellevue, Washington

Ed. note: Although not a 707 transcontinental flight engineer's job breakdown, *AIRLIFT* was able to get this list for a U.S. international jet flight engineer.

1. Report for latest information advisory at least 2 hours prior to scheduled departure.

2. Proceed to aircraft to discuss

maintenance and then complete engineer's preflight check list.

3. Prior to departure: a. Supervise fueling of aircraft. b. Advise Captain of maintenance condition. c. Advise Flight Service of any maintenance affecting service to passengers.

4. Per cockpit check list (with pilots): depart aircraft to point of takeoff. Start fuel tracking on Jet Aircraft Log Performance Supplement. Also during taxi, constantly monitor aircraft system.

5. In position for takeoff: Survey all engine and system operating conditions.

6. During takeoff: Monitor all engine and system operating conditions making any necessary corrections or calling pilot attention to unusual or malfunctioning operation where controls are at pilot stations.

7. After takeoff: a. Read (and perform parts of) After Takeoff Check List. b. Monitor engine and systems operation. c. Provide pilots with power settings for climb (at least every 2-3 minutes). d. Track fuel by recording every three minutes. e. Operate systems

at engineer's station for climb performance.

8. Cruise: a. Track fuel every 30 minutes. b. Provide pilots with proper power settings. c. Monitor and record all engine and systems operations. d. Analyze any malfunctions whether in cockpit or cabin and, if possible, perform in-flight repairs. Make such complete analysis that maintenance at next ground transit is reduced to a minimum. e. Keep Captain constantly informed of the maintenance condition of aircraft, making such recommendations as knowledge of system and good judgment may dictate.

9. Descent and landing: a. Read check list and perform required items. b. Track fuel at each change of power to provide a constant source of information of remaining endurance if approach must be discontinued. c. Monitor operation of engines and all systems.

10. Maintenance responsibility: Write proper reports of any malfunction directing or advising corrective action specifically.





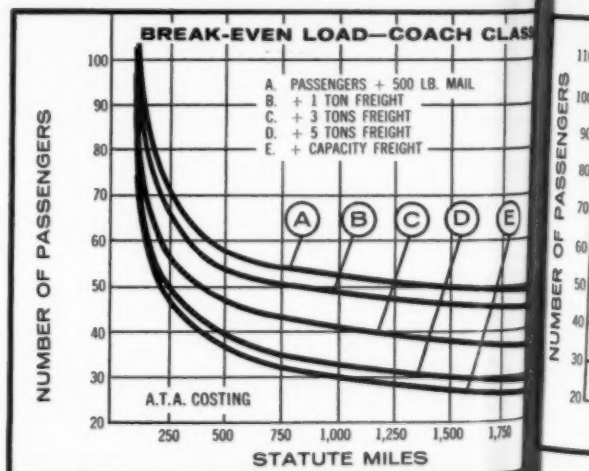
## LOWEST JET AGE OPERATING COSTS

No other jet age airliner—pure jet or jet-prop—can match Vanguard's economy of operation. Seat-mile costs can be *under 1¢* on all stages over 1,000 miles; and only 1.4 cents at 200 miles.

"Passenger only" break-even loads are 61 first class or 68 coach class on a 250-mile sector, and as low as 46 and 52 passengers respectively at 1,000 miles. This is *without* freight revenue. With 3 tons of freight, only 55 coach passengers are needed to break even at 250 miles, and 40 at 1,000 miles. Vanguard's below-deck cargo holds enable the aircraft to be a profit-maker on off-peak services and in off-peak seasons.

Low altitude routing will not adversely affect these low costs. The difference in trip cost between a 500-mile sector flown at 10,000 feet and 20,000 feet (most economical) is only \$44.

Vanguard's low operating costs and large, well-balanced payload capacity of 29,000 pounds mean the *highest profit potential in airline history!*



This graph emphasizes the Vanguard's considerable cargo-carrying capacity. When freight is carried, the economic flexibility of the aircraft is underlined. With freight the passenger need comes down to as low as 47 passengers on a 250-mile stage and 30 for 1,000 miles.

NEWEST FROM THE WORLD LEADER IN JET-PROP AIRCRAFT . . .  
 POWERED BY FOUR ROLLS-ROYCE TYNE ENGINES





139 passengers . . . 8 tons of freight . . . 425 mph . . . 2300-mile range

As a result, Vanguard makes the introduction of promotional fares and other traffic-builders not only possible—but highly *profitable*.

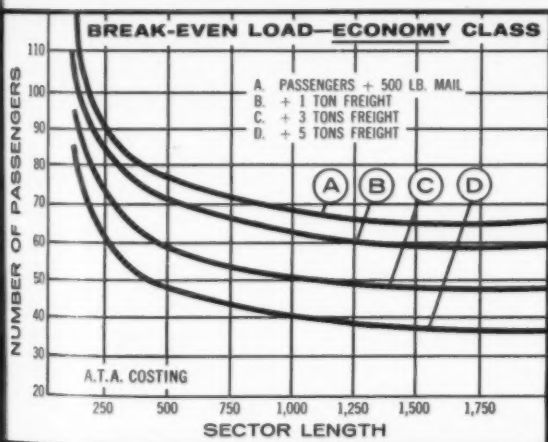
#### TOPS IN PASSENGER APPEAL TOO!

Inside the comfortable cabin, Vanguard will be as quiet as the Viscount. Vanguard block speeds have been proved as fast as jets right up to medium-distance sectors; though Vanguard has been flown at less than half jet costs! And, due to the absence of ATC approach, stacking and noise problems, there won't be as many delays in high-traffic areas.

For further details and a cost analysis based on your operations, contact Christopher Clarkson, U.S. representative, 10 Rockefeller Plaza, New York 20, N. Y.

#### WORLD'S ONLY 2nd GENERATION JET AGE AIRLINER!

Vanguard benefits greatly from the more than 2 million hours of worldwide in-the-air experience of 400 Viscounts . . . and there is *no* substitute for experience!



The "economy" class promotional fare potentialities of the 139-seat Vanguard are shown by these curves which give the break-even needs on all costs (indirect costs taken at 100% of direct) at a fare rate of only 4 cents a mile. This is a 25% reduction in existing coach fares. Freight revenue is taken as 21.8 cents a ton mile; mail as 34.7 cents, and express as 34.3 cents.

VICKERS

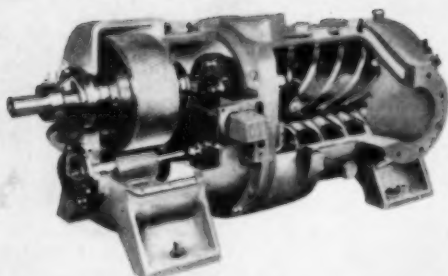
# VANGUARD

VICKERS-ARMSTRONGS (AIRCRAFT) LTD. • WEYBRIDGE, ENGLAND • MEMBER COMPANY OF THE VICKERS GROUP

APRIL, 1960

13

# *From Stratos...* **NEW GROUND STARTING UNIT FOR TURBINE AIRCRAFT**



The Model GSA-10 *Stratosair* offers airline and military operators today's most economical and effective means of providing a continuous ground air supply for turbojet and turboprop aircraft. Heart of the *Stratosair* is a unique Heli-Rotor compressor that provides the output required for engine starting for any current aircraft. The unit also can provide warm air for deicing and a continuous supply of air for air conditioning, heating and check out of pneumatic systems.

The Heli-Rotor combines the non-surge characteristics of a positive displacement compressor with the high delivery rate at low weight and small size of high speed aerodynamic machines.

The Heli-Rotor has recommended overhaul time of 10,000 hours. With a standard industrial engine as the driving medium, overhaul costs and parts stocking are slashed to a minimum—to less than 30% of gas turbine compressors. Initial cost is competitive with truck-mounted turbo-compressors. The requirements of turbofan engine can be met by the present Heli-Rotor compressor with a more powerful driver since it is being operated well below its design capacity in the GSA-10.

The illustration shows the Heli-Rotor pack mounted on a standard International 1½-ton truck. It can be provided on a skid mount, on a simple trailer mount or mounted on any of a variety of suitable trucks.

The compressor drive is an International UV549 V-8 engine. The engine-compressor package has its own cooling system. A pedestal-mounted control panel can be operated from the ground or swing 90° to permit operation from the driver's seat. Discharge pressure regulation is automatic with double protection provided by an additional relief valve that unloads the compressor if normal operating pressure is exceeded.



*For complete data  
on Heli-Rotor Compressor package, write to*

## **STRATOS**

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### **The Jets Keep Coming**

**Scope of industry's re-equipment program:** every month for the next three years some U.S. trunk airline will be taking delivery of a pure jet aircraft. Peak this summer will reach 16 in a month.

### **Cockpit Paperwork**

**Crux of the problem** of resolving what is the ideal military/civil cargo jet is truck-bed floor level. This means a high wing, with built-in economic losses the airlines don't want to sustain. Military is split in two camps, one favoring superior low-wing speed and economics, the other Eutopian loadability. Observers feel this is the problem Sen. Monroney, FAA Administrator Quesada, Defense Dept. and airline officials must tackle and solve before any real progress is possible.

**Pilots are checking** FAA inspectors—as well as vice versa. Following FAA's stepped-up program of checkriding airline flights, ALPA gave pilots nine-point forms, asked them to rate inspectors—cooperative, uncooperative, annoying. Union also wants to know whether FAA men create any safety hazard in flight, interfere with the flight, or ask for techniques not covered by pilots' training. ALPA urges members to send reports to Chicago headquarters for statistical computation and analysis.

**Airline staff personnel hardly agree** with ATA directors' order that ATA committees meet only in four cities: New York, Chicago, Washington, Kansas City. Action reportedly was for budgetary reasons and to erase criticism that groups always convene in resort areas. But opponents claim the four "magic" cities are the most expensive for meetings, substantially higher than the cheap off-season rates in vacation areas.

### **3-Man Crew For TCA Jets**

**Last holdout** for a two-man jet crew, Trans-Canada Air Lines, has switched to three. Canada's Department of Transport ordered the increase after problems with FAA in certifying the DC-8 with only two pilots. TCA had specially engineered the cockpit with copilot's seat on tracks so he could operate controls on flight engineer panel. DOT reportedly is neutral on skill of third man—doesn't care much whether he is pilot or engineer qualified.

**February wasn't a good traffic month** for the trunk industry as a whole. Increase was about 5% over same 1959 month after adjustment for extra day this year. Available seats are outgaining passengers. Jet traffic is reported to be holding up; piston loads are down. And accidents have had an effect.

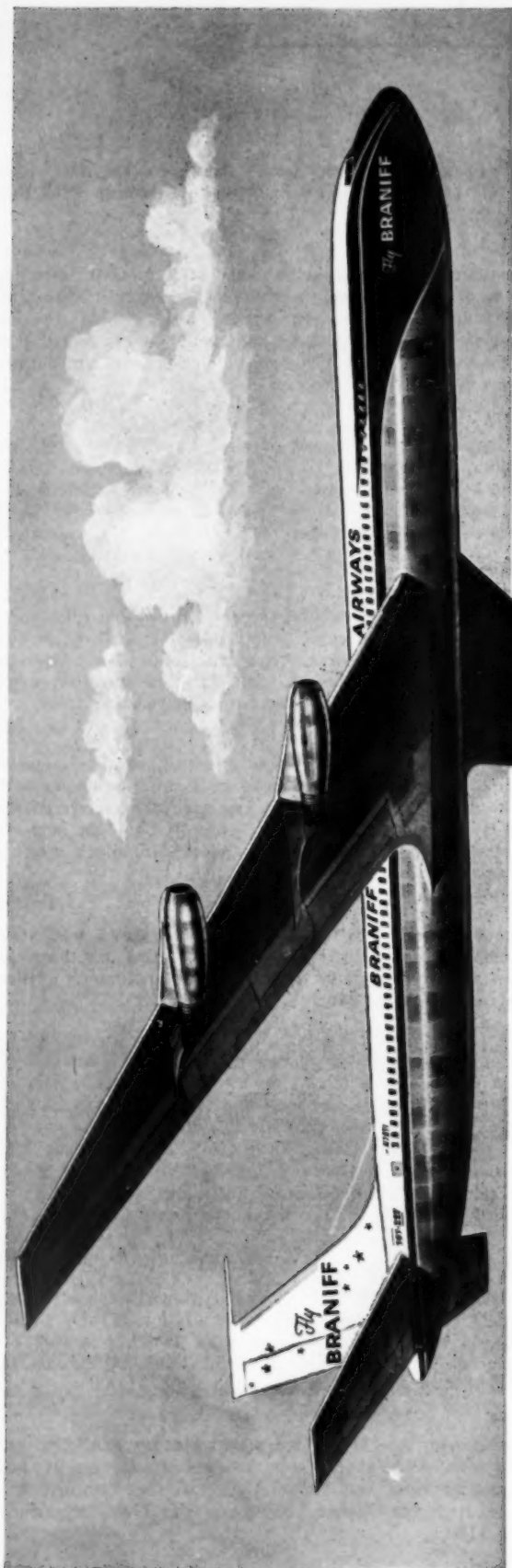
### **Boost for Hercules**

**FAA certification** of Lockheed C-130B military turboprop transport may be in the works. Much interest in the plane was stirred up by Air Materiel Command's specifications for fiscal 1961 Logair bidders—planes used must have front or rear loading capability, truck-bed loading height, be able to haul outsized cargo. National Airlines submitted Logair bid, said it would buy five C-130Bs, at \$2.8 million each, with first delivery in March 1961, contingent on certification. Lockheed has also had queries from non-aviation companies that must move odd-sized loads fast. Whether C-130B will go through full certification, or whether a special regulation will be sought, isn't known yet.

**Chicken-and-egg dilemma** caught up with Capital Airlines. Company needs new planes to boost traffic—but it needs more traffic now to finance new planes. Traffic has slumped (\$3.9 million loss in first two months of 1960), primarily due to accidents and bad weather. So Capital asked CAB for \$12,949,000 subsidy for year ending Mar. 15, 1961—a year in which it expects to lose \$9,731,000.

### **More Comfort Aboard MATS?**

**Mixed-up world department:** Recent call for sealed bids by MATS to refit 65 of its passenger transports with airline-quality seats brought strange results. Low bidder, at about \$120 per passenger seat, was Colonial Aircraft Co., Sanford, Me., builder of the Skimmer amphib. High was Chance Vought at about \$789. Experienced seat makers bid in at around \$250.



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## Pinkline on the Electra

After 14 months of rewriting the timetables for short and medium-haul airline operations, Lockheed's fast-moving Electra turboprop has been throttled back to new limits.

In the atmosphere of a technical puzzle surrounding the loss by Northwest Airlines of an Electra on March 17, FAA ordered normal operating cruise limits backed down from 292 to 262 knots at 18,000 ft. and a week later made a further cut to 225 knots.

Behind FAA's action was the still undetermined cause of a similar Electra mishap, a Braniff airplane, near Buffalo, Tex., September 29. In both instances, investigation showed a section of wing three or four miles from the remainder of the aircraft. And although CAB has been able to reconstruct quite accurately the sequence of events in the BNF accident, the cause that touched them off remains to be uncovered.

## Old Pilots and Legal Ladders

FAA Administrator E. R. Quesada and his lawyers won a first-round court victory over Air Line Pilots Assn. in defense of their ago-60 ban on airline flying, but immediately faced up to rung No. 2 on the legal ladder—an Apr. 8 hearing in the New York Circuit Court of Appeals.

In the meantime, FAA's Mar. 15 deadline was imposed and some 664 years of airline flying experience, represented by 24 ALPA member pilots, disappeared from the cockpits. Their total flying time: about 600,000 hrs.

For ALPA, the court battle is one of principle, the group older than 60 being a scant 0.19% of its membership. Only 131 (0.91%) are between 55 and 60; 611 from 50 to 55 (4.4%); 4,375 between 40 and 50 (31.4%). Largest group: 7,440 (53.39%) aged 30-40, with only 1,393, or 9.9%, between 20 and 30.

To date the case has been dominated by the strategy of lawyers, with FAA's counsel outmaneuvering ALPA. Some pilots attribute the first-round defeat to a basic error in strategy: ALPA's decision to fight the case with its legal experts in labor bargaining instead of hiring top-flight counsel specializing in administrative law.

## Everything Was Wrong

After three weeks, U.S.-British bilateral talks at Barbados recessed to a later date in London. Decision to meet later—and an earlier one not to talk to the press—were the only agreements reached. Failure was not so much the result of policy disagreement as it was of bad administration—the wrong people were meeting in the wrong place at the wrong time.

Neither delegation had authority to commit its government. Every question had to be referred to London or Washington. Bad mail, cable and radiotelephone communications made for an impossible situation.

Timing of talks was bad. Both sides still had fresh on their minds past indignities suffered in trying to get action under the present Bermuda agreement. CAB took a firm stand on a number of points. A British compromise to allow Northwest to serve Hong Kong, but as a terminating point on a new Pacific route, was rejected by CAB when referred to Washington. British requests for new routes from the Caribbean to such points as Atlanta and Chicago, and proposal to make it harder for either nation to name more than one of its airlines to serve a route were rejected.

The British showed some sympathy for European route

problems of Seaboard & Western; U.S. was agreeable to revision of procedures for adding minor points in third countries to existing routes. But in the general no-compromise climate prevailing, final agreement was impossible. There seems little hope that London discussions will yield any better results.

## Boxscore on Credit Cards

Airline ranks are far from solid against use of "outside" credit cards. Although most carriers some months ago expressed the conviction that only their own Universal Air Travel Plan should be honored, eight lines are now doing on-line business with other organizations. Western, which consistently refused to join any move to ban outside cards, led the way by signing with Diners and Hilton Carte Blanche, and Pacific joined with Hilton (Airlift, Sept.). In addition, Northeast, Continental and Aloha honor Diners and Hilton; Hawaiian, Hilton; Trans-Texas and Alaska, American Express.

## IATA Agrees on Fares

A simplified fare structure, slight reduction in some tariffs, and separate jet and piston fares were agreed upon by International Air Transport Assn. in Paris. Only area where agreement was not reached was transpacific.

Airlines will offer only first-class and a low-fare service, called either economy or tourist, depending on the area. Jet surcharges and deluxe service will be abandoned on May 1 on the North Atlantic, and tourist class will be dropped July 1. Jet seating will generally eliminate berths and sleeperettes; pistons can offer reduced fares or more liberal seating. Jet economy seating was set at six-abreast at 34-inch pitch, with five-abreast in Comets.

Here are New York-London one-way fares (May 1):

	New	Old
Jet 1st class .....	\$500	\$500 deluxe + \$20 surcharge
Jet economy .....	270	257 + 15 surcharge
Piston 1st class .....	500 sleeperette	500 sleeperette
	440 regular seat	440
Piston economy ..	250 on-season	257
	240 off-season	257

Carriers will also offer a 17-day roundtrip economy excursion between Oct. 1 and Mar. 31 at basic New York-London fare of \$350 in jets, \$320 in pistons.

On mid-Atlantic, present fares generally continue to Oct. 1, when deluxe is discontinued and standard first-class fares will apply to both jets and to piston/sleeperette. Piston first-class will be lower for regular seats. Tourist class ends Oct. 1, replaced by economy at 16% less. Piston economy will be at least \$30 one-way less than jets.

Europe-Far East-Asia remains unchanged to Oct. 1, when first-class increases slightly and economy is cut 6% to 10%. Jet and piston fares will be the same, with more liberal piston seating. Europe-Africa first-class fares increase up to 10% Oct. 1, but tourist comes down about the same amount.

Although Pacific fares expired Mar. 31, current level will probably continue until the fall IATA meeting.

## About-Face in Commerce

A government report which—to everyone's surprise—favors less CAB regulation and more management freedom for airlines was issued by the Commerce Dept. and sent to Congress by the White House.

The report, "Federal Transportation Policy and Program," calls for gradual but extensive changes in the gov-



ernment's role in all phases of transport. Aviation recommendations were:

**Greater freedom** for airlines in setting rates. CAB should approve maximums and minimums, but only in exceptional cases. Maximum should be applied mainly to monopoly points, minimum to competitive areas.

**Continuation of CAB policy** of adding competition on leading routes, but a moratorium on additional parallel certificates where jets will be used, until jet impact has been experienced and evaluated.

**Less control** over scheduling. New legislation should allow CAB to permit some carriers to explore possibilities of mass transport through "no-frill low-fare flights in high-density markets.

**Domestic trunks** should not be eligible for subsidy after five years of subsidy-free operation. Local airlines' subsidy should be based on service rendered each locality rather than on carriers' needs. Use-it-or-lose-it policy must be "rigorously enforced." Locals should be allowed to serve cities via combined air and motor operation.

**Legislation establishing** airways user charges, using present and recommended gas taxes, plus kerosene taxes. Commerce should also study airways costs.

**Air cargo development** encouraged by reduction of MATS and use of civil lines by Defense Dept. FAA should study cargo plane development, including guaranteed loans.

## An Airline for Sale

A new twist in used transport sales is current trip of Capt. Rube Hadfield, manager of aircraft sales for Trans-Canada Air Lines, halfway around the world trying to sell a whole airline. Hadfield's package: a fleet of 21 TCA North Stars, complete with engine overhaul shop, flight simulator, spares, even ground equipment, all for delivery between Sept. 15, 1960 and April 1961.

## Strike Pact Enlarged

Three more airlines joined the six-carrier mutual aid strike pact, which has been amended. New members are National, Braniff and Northwest. Pact previously covered strikes in which union demands exceeded recommendations of a Presidential emergency board, or where there was a strike by a union which had not exhausted Railway Labor Act procedures. New pact covers strikes called in the absence of a Presidential board and "the struck party has in all respects acted in compliance with the Railway Labor Act." Original members were Pan Am, American, TWA, Eastern, Capital and United.

## JetStars for Pan Am

Pan American World Airways, operator of big jets, also sees a bright future in leasing small jets to business users. It is expected to order 16 Lockheed JetStars, with option on 40 more over four years. Contract signing awaits CAB approval of PAA's plan to establish a leasing subsidiary, to be called Jet Executive Transport Service Inc. (JETS Inc.)

The four-engined JetStar made its first flight at Marietta last month, and commercial deliveries of the \$1,192,330 plane will start next January.

## New on the Order Books

**SALES: United Air Lines:** \$65 million order for 20 Caravelle jets (AIRLIFT, Mar.) powered by Rolls-Royce

Avon 531Rs rated at 12,725 lbs. thrust, first delivery in April 1961. **Braniff Airways:** letter of intent to buy three Boeing 720-027s powered by P&W JT3-C-7 dry engines, delivery in Feb., Apr., Sept. 1961, with option on a fourth. **Qantas:** order for three turbofan Boeing 707-138Bs. Present 707 fleet will be modified to turboprops by end of 1961. **Continental Air Lines:** negotiating to buy a fifth Boeing 707. **Japan Air Lines:** informal decision to buy three Convair 880-22M jets. **Quebecair:** will purchase at least one more Fairchild F-27 this year, considering ordering another six over next two years. **All-Nippon Airways:** received Japanese government approval to buy three F-27s from Fokker. **Trans-Australia Airlines:** ordered a third Lockheed Electra.

**CONVERSIONS: Lufthansa:** Lockheed Aircraft Service to convert two Lockheed L-1649As from passenger to cargo, plus option on two more. **Allegheny Airlines:** first five Napier-powered Convair 540 turboprops to be converted by AiResearch (powerplants, accessories, etc.) and Butler Aviation (cabin interiors).

**LEASES: Hawaiian Airlines:** DC-6C from AAIXCO for MATS contract work, bringing four-engined fleet to two.

## Briefs

**Transocean Airlines** suspended most operations, laid off all but 50 of 1,800 workers and grounded its 14 Boeing Stratocruisers. Company is trying to refinance.

**Convair 990** will be American Airlines' designation for Convair 600. Reason: to eliminate any impression that the plane is older or inferior to Convair 880. (If new designator is mistaken for speed, AA can't lose. It's Mach 1.3!)

**Same-plane through service** New York-Moscow via Brussels with Boeing 707s will start Apr. 6 by Sabena. Service will operate Wednesdays.

**Another annual dividend** of 25¢ was paid by Trans-Texas, which showed 1959 net of \$163,327. A year ago TTA became the first local to pay a cash dividend.

**CAB staff published** the second in a series of research reports, a worthwhile document, entitled "General Characteristics of Turbine Powered Aircraft." Write Warner H. Hord, Chief, Office of Carrier Accounts and Statistics, CAB, Washington, for distribution details.

**TECO Inc.,** Burbank, Calif., airplane seat manufacturer, was purchased by E. Gilbert Mason, former director of design for American Airlines, and J. Ross Clark & Associates. Mason will be president and general mgr. Gordon Jones, founder, remains as a consultant.

**Five-year pooling agreement** was signed by Air France and Japan Air Lines covering Tokyo-Europe polar route. AF will provide Boeing 707s until JAL's DC-8s go on the route next year. At that time, each line will fly its own planes, with revenues pooled on a pro-rated basis according to capacity offered.

**A 50% discount** on excess baggage charges to frequent air travelers is proposed by Braniff. A commercial discount baggage ticket, good for \$100 worth of excess baggage, would be available at ticket counters for \$50. Ticket would be good for one year; not more than \$20 nor less than \$5 could be used on one flight.

**New Convair** sales demonstrator, sporting an interior incorporating suggestions from potential customers, will be received this month by Frederick B. Ayer & Associates. Conversion of the former airliner was done by AiResearch. Engines are P&W R2800-CB16. Sales price for similar models: slightly over \$338,500.

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## Convair 880 shrinks weight with new type B.F. Goodrich zippered panels

The target of the designers of the Convair 880 was to make the ship the fastest jet airliner. Thus these zippered rubber panels, used in both fore and aft cargo sections, had to exceed existing types in strength/weight ratio.

A new construction by B.F. Goodrich provided the answer. The panels have the lowest weight, meeting strength requirements, of various designs considered. The material is very tough—a special rubber, resistant to oil, gas, or water, on glass fiber fabric. Metal reinforcing edges are built for high load factors.

Some 25 of these panels are used in the 880 to seal the compartments against air or fuel vapor, yet permit instant access to concealed equipment. Color is white to provide good light reflection; cleaning is easy.

B.F. Goodrich has outstanding experience in fabricating zippered panels for sealing...interior compartments, air ducts, access ports, and other areas. For technical assistance, check with *B.F. Goodrich Aviation Products*, a division of *The B.F. Goodrich Company*, Dept. AL-4, Akron, Ohio.

The B.F.G. Pressure Sealing Zipper is designed with a precision fit of the rubber lips to make a tight seal, even around curves and corners. Opens quickly, like an ordinary zipper—yet seals out liquids, gas, air and dirt.



# **B.F. Goodrich** aviation products



February, 1916 . . . Guynemer in a Nieuport XI attacks an L.V.G. two-seater.

## Early War Birds—THE NIEUPORT XI

This biplane was introduced in the fall of 1915 as France's answer to the Fokker E-1 and its forward-firing synchronized machine gun. Developed as a smaller version of an existing two-seater, the Nieuport XI was the first model in a series of "V-strutter" scouts used up until 1918. The XI was powered with an 80-horsepower rotary engine that gave it a top speed of 97 m.p.h. with an initial rate of climb of 750 feet per minute. Since the Allies had yet to come up with a synchronizing device, a single Lewis machine gun was mounted on the top wing to fire over the propeller.

With the appearance of the Nieuport XI, France had its first real "fighter plane" . . . and a new breed of heroes like Georges Guynemer to fly them. Frail, sickly, yet filled with an intense desire to fly, this youth argued his way into pilot training after serving as a mechanic. Upon becoming a

pilot, he was assigned to Escadrille Morane Saulnier 3 (later the famous "Les Cigones" or "Storks"). Early in February, 1916, a few months after he had been assigned a Nieuport XI, Guynemer brought down three L.V.G. two-seaters in the space of forty minutes. The first of these was not accredited since it was not observed. However, the other two fell in sight of the Allied lines less than 10 minutes apart. This notable feat, which brought his total to 6 victories, was the first in a series of skillful and daring exploits.

By September 11, 1917, Captain Guynemer, at 22 years of age, had 53 accredited victories and was the French Ace of Aces. On that day, he flew his last patrol . . . vanishing mysteriously without a trace. To the end, the legendary "Winged Sword of France" remained seemingly invincible, accepting nothing from his enemies . . . not even a wooden cross.



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APRIL, 1960

# DRAMATIC ANSWER TO THE AIR CARGO DILEMMA

Many air carriers, striving to answer perplexing questions presented by a growing air cargo industry, are facing a basic decision: should they convert outmoded piston engine passenger equipment and put it on to air cargo routes? Should they order proposed cargo jets with 100,000 lb. payloads? Should they wait for further turbo-fan evaluation before making their air cargo plane commitments?

**Canadair's Forty Four**, offers a simple, practical answer to these vital questions. It is an optimum-size, all-new, all-cargo turbo-prop airplane that, in terms of productivity, is vastly superior to converted piston engine equipment, and one that offers, in comparison with the big jets, a payload capacity that is not unrealistically high for profitable operations during the 1960's. Furthermore, the Forty Four suffers little or no operating penalties due to runway limitations, and there will be no community noise problems.

The Canadair Forty Four has a productivity two to three times that of converted piston aircraft, at the same cost per airplane mile, and has a profit potential that will quickly recover any losses on disposal of piston engine aircraft now being used or contemplated for cargo usage. On the other hand, the Forty Four with a payload capacity of 65,000 lbs. and low break-even point is ideally matched to the natural expansion of the cargo market and will begin immediately to operate at profitable load factors.

The Canadair Forty Four is flying now and is in production for the three largest all-cargo carriers in the United States, and

can be introduced into existing fleets as early as January 1961. The Canadair Forty Four can operate in and out of all airports presently used by four-engined piston-powered aircraft. For example, at such an important airport as Midway, in Chicago, with only 6400' runways, the Forty Four can take off with 90% of its maximum payload and fly non-stop to San Francisco. Sophisticated design features, including swing tail and integral cargo handling equipment, slash direct and indirect costs. Step-by-step savings and economies inherent in the Canadair Forty Four, combined with its very attractive price, let precious capital dollars work for better return quicker than other "proposed" equipment.

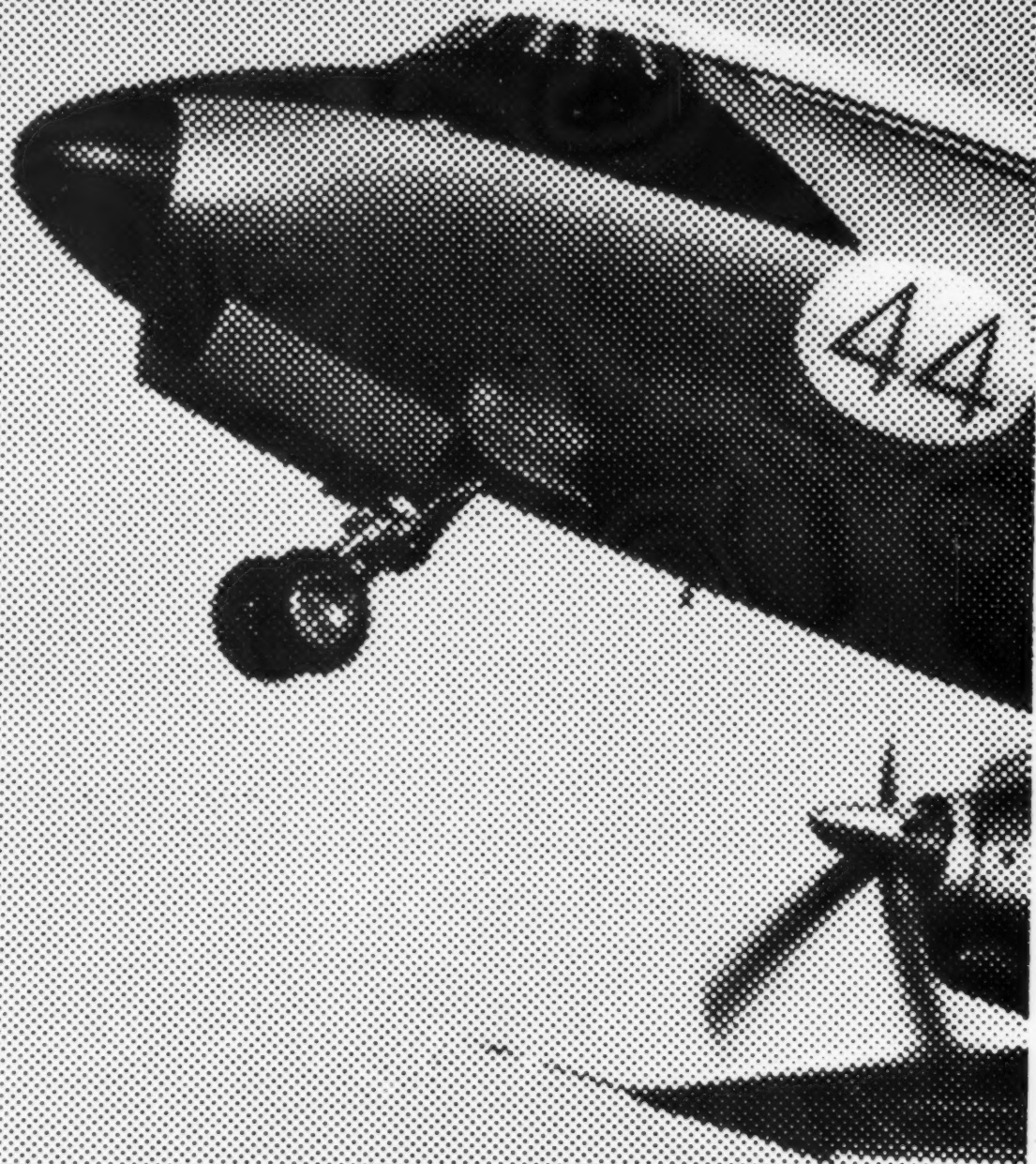
Thus General Dynamics Corporation's Canadian subsidiary, Canadair, the specialist in air cargo, proposes the Forty Four as the answer to air cargo's biggest dilemma.

#### **Principal Features of the Canadair Forty Four**

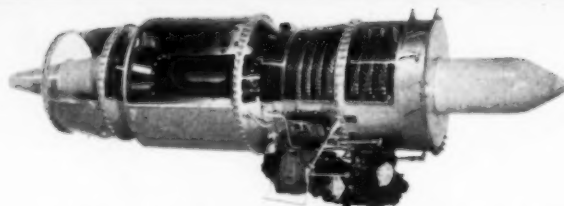
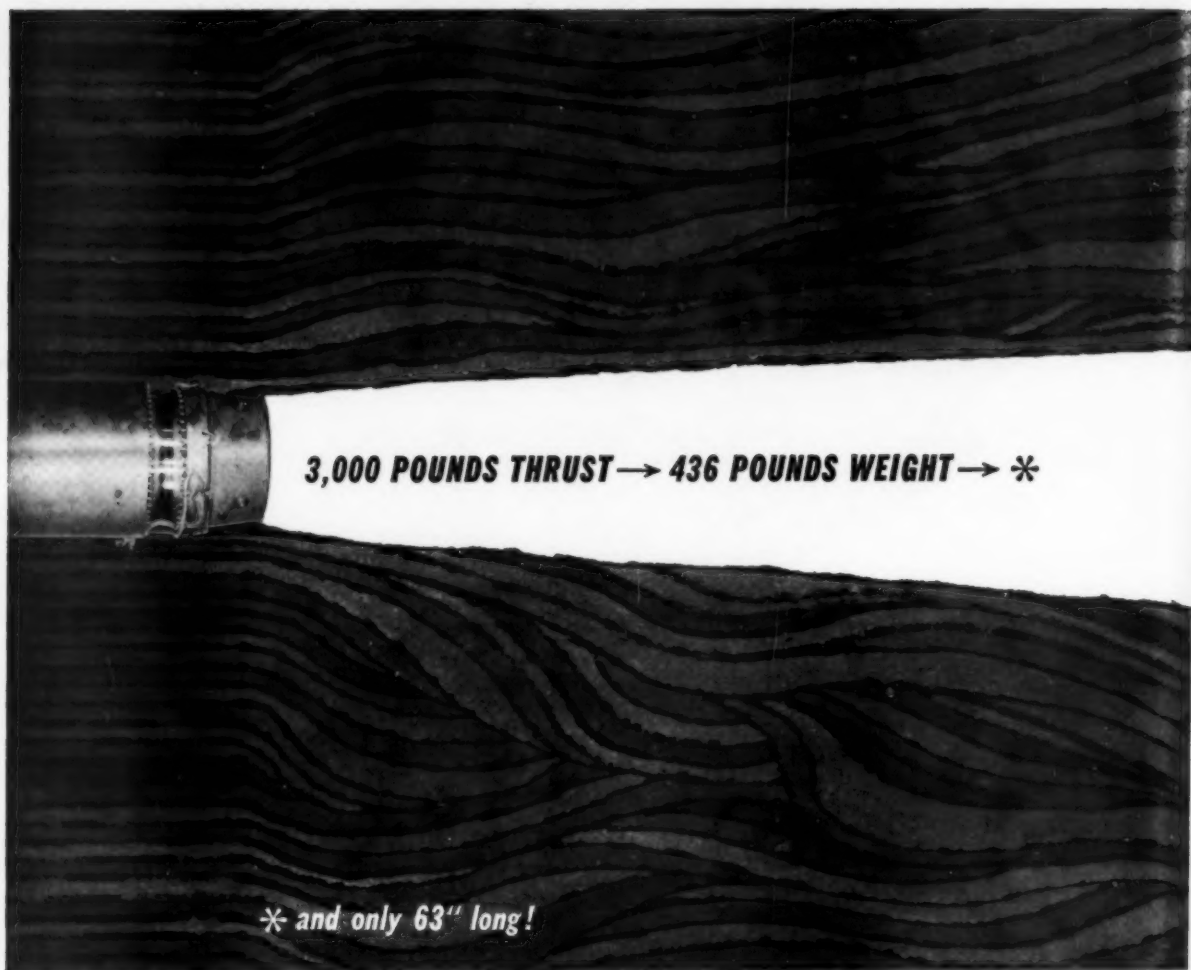
1. Low prime cost—less than  $\frac{2}{3}$  the price of proposed jets.
2. Low operating costs—estimated at \$1.30 per aircraft mile, and less than 4¢ per ton mile.
3. Right size for the 1960's—its present payload capacity is ideally matched to forecasted requirements.
4. No community noise problems—confirmed during present flight testing.
5. No airport or runway limitations—every major airport open to the Canadair Forty Four.
6. Growth potential—able to grow with the market.
7. Available for delivery in January 1961.

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# Capacity Grows, Grows, Grows!

Key markets are showing first results of the fast buildup of turbine schedules. Bigger seat battle looms as orders keep coming.

By JOSEPH S. MURPHY

**T**HE BIG SQUEEZE is on. On segment after segment, the early "exclusive" jet operators are reaching the twilight of their harvest of no competition from the jet "have nots." And a battle of capacity such as never before witnessed by industry is fast taking shape.

At the same time, carriers are taking stock of their position. Ordering more jets. Some for delivery within months, others a year away. Last month alone, United ordered 20 Caravelles, Braniff and Western Boeing 720s. And there are more to come.

But key U.S. domestic markets already are showing some startling effects under the impact of the jets and turboprops already in operation. Nearly 11,000 nonstop seats daily linking New York and Washington. Eighty-four nonstops each way!

Almost 8,000 seats a day nonstop or one stop in the New York-Chicago market. More than 6,000 between New York and Miami; 4,200 between Chicago and Los Angeles; 2,700 New York-Los Angeles. And so on.

As a base for future comparison, *AIRLIFT* here relates this upshoot in capacity with ticket sales for the last quarter of 1959. Schedules are those published in the January 1, 1960 Official Airline Guide Quick Reference Edition. Here's how the 10 markets shape up (see table for details):

- **Washington/New York**—10,865 nonstop seats daily both ways with eight trunks and one local in the market. Although orphaned of big jets by Washington's airport inadequacies, service is 26% turbine including Electras and Viscounts. Although Eastern produces by far the greatest capacity, many of its flights are not aimed directly at this market and it ranks second to American. AA takes 38.6% of seat sales despite a very low (4%) conversion to turbines. Fifteen different aircraft types operate today, everything from DC-3s to Electras and Jetstreams.

- **New York/Chicago**—7,989 seats daily, nonstop and one-stop. Five major trunks operate 81 flights each way daily, 40 nonstop. As capacity begins to flood transcontinental nonstop segments, the big jets are starting to move in here. Until now operation has been 35% turbine, mostly Electras and Viscounts.

Fourth quarter statistics show AA with 54% of seats sold with United its nearest contender at 22%. Capital, TWA and Northwest account for the remaining 24%, with the entire route operation following the pattern of capacity offered.

- **San Francisco/Los Angeles**—7,597 seats both ways daily, including 48 nonstops each way. United and Western, running No. 1 and 2 in capacity offered, realized 54.8 and 35.9% of ticket sales. Despite its short stage length (only 347 miles), the segment boasts four flights with big jets, three DC-8s and one 707. Lack of data on Pacific

Southwest Airlines, an intrastate operation, hampers complete traffic analysis.

- **New York/Boston**—7,579 nonstop seats a day with five trunks operating 72 daily flights and 62 nonstops each way. Although still jetless, Electra and Viscount have converted this route to 36% turbine. American ranks No. 1 with 43.8% of seat sales, Eastern No. 2 at 32% and Northeast 17.3%. AA, 14% turbine, leads the market.

- **New York/Miami**—6,196 seats a day (nonstop and one-stop) although the introduction of DC-8s by Eastern and National is rapidly changing the capacity picture here. Despite inroads by both NAL and Northeast operating leased 707s, Eastern dominated the fourth quarter market results realizing 51.2% of seat sales. National took 40%, Northeast 8.8%, although NEA's 707 service did not begin until December.

- **Chicago/Los Angeles**—Probably the most competitive of the medium haul jet routes, this four-carrier battleground is feeling the first effects of United's DC-8 fleet buildup. With three daily nonstops each way, American, Continental and TWA garnered 32.2, 26.9 and 24.7% of the business respectively. United, which held a pre-jet share of about 35%, took 16.2% but can be expected to strengthen this position when it matches the capacity of its competitors.

- **Minneapolis/Chicago**—3,086 seats a day with four airlines, two trunks and two locals, operating 37 flights a day each way. Electras and Viscounts are used extensively by Northwest and Capital to make the service 38% turbine. NWA registered 80% of tickets sold in last quarter, 1959, highest for all segments studied.

- **New York/Los Angeles**—2,703 seats a day including nonstop, one- and two-stop services. The perennial battleground for American, TWA and United, this market will see the most active jockeying for position among the three. Since January 1, AA has dropped one flight (piston), while UAL has added two, both jets. AA rang up 51% of ticket sales, TWA 37% and UAL, which had pulled out of nonstop competition for the first three quarters of 1959, had rebuilt to 12%.

- **Chicago/Miami**—2,132 seats a day, nonstop and one-stop. A three-carrier competition quickly converting to turbine. Traffic study shows Delta, presumably on the basis of DC-8 service, recording 48.8% of seats sold, EAL 42.3% and Northwest, 8.9%. Incidentally, this may prove the only major route segment in the U.S. which will not see 707 jet service unless additional orders are forthcoming. Delta, EAL and NWA all are DC-8 operators.

- **New York/San Francisco**—2,013 seats a day, nonstop, one- and two-stop. Here, too, competition is building up to a peak as United adds DC-8 schedules (it increased to six a day by March 1) to outrun TWA and American. Operation



is a strong 57% turbine with TWA taking 50.5% of fourth quarter ticket sales, United 30.5% and AA, newcomer to nonstop San Francisco service, 19%.

## —The Top Markets—Who's Getting What—

Here are the 10 markets surveyed by AIRLIFT listed in the order of total seats offered daily. Table shows total flights, non-stops, turbine schedules, % conversion to turbines and the wide variety of aircraft used. See notes below for explanation of traffic results:

### WASHINGTON-NEW YORK (205 air miles)

	No. of Flights	N.S.	Tur- bine	Per- cent	A/C Types	Seats Sold	% of Total
EAL	46	34	7	15	6	70,090	36.1
AA	27	19	1	4	4	75,130	38.6
NAL	11	6	3	27	4	8,220	4.2
NEA	10	10	10	100	1	24,170	12.4
CAP	6	5	6	100	1	5,660	2.9
UAL	4	4	0	0	3	3,050	1.6
TWA	3	3	0	0	3	2,680	1.4
BNF	3	3	2	66	2	3,440	1.8
AAA	3	0	0	0	2	(D)	(D)
Totals	113	84	29	26	15*	194,210	

\*Turbine: Viscount & Electra; Piston: DC-3, Convair, Martin, DC-6, 68, -7, 7B, 7C, Connie, Super Connie, Super C, G & 1649A.

### NEW YORK-CHICAGO (713 air miles)

AA	26	17	12	46	4	114,690	54.0
UAL	22	8	0	0	3	47,030	22.0
CAP	17	6	16	94	2	22,170	10.4
TWA	12	5	0	0	4	18,140	8.5
NWA	4	4	0	0	2	10,660	5.0
Totals	81	40	28	35	12*	212,690	

\*Turbine: 707, Electra & Viscount; Piston: Convair, Martin, DC-6, 68, 7, 7C, Super Connie, Super C & G.

### SAN FRANCISCO-LOS ANGELES (347 air miles)

UAL	32	20	2	6	4	138,460	54.8
WAL	17	16	4	23	2	90,590	35.9
PAC	9	0	5	55	2	2,730	1.1
TWA	8	6	1	12	4	20,760	8.2
PAS	6	6	6	100	1	(NA)	—
Totals	72	48	18	25	12*	252,540	

\*Turbine: 707, DC-8, F-27 & Electra; Piston: Convair, Martin, DC-6, 68, 7, Super Connie, Super G & 1649A.

### NEW YORK-BOSTON (188 air miles)

EAL	26	20	8	31	5	77,170	32.0
AA	21	18	3	14	3	105,180	43.8
NEA	18	16	13	72	3	41,190	17.3
NAL	3	3	2	66	2	8,450	3.5
TWA	3	3	0	0	1	6,050	2.5
UAL	1	1	0	0	1	2,310	0.9
Totals	72	62	26	36	10*	240,350	

\*Turbine: Viscount & Electra; Piston: DC-3, Convair, DC-6, 68, 7B, Martin, Super Connie & Super C.

### NEW YORK-MIAMI (1,092 air miles)

EAL	31	16	8	26	6	117,570	51.2
NAL	16	11	7	44	6	91,920	40.0
NEA	4	3	1	25	2	20,020	8.8
Totals	51	30	16	31	11*	229,510	

\*Turbine: 707 & Electra; Piston: Convair, DC-6, 68, 7B, 7C, Super Connie, Super C, G & H.

### CHICAGO-LOS ANGELES (1,745 air miles)

TWA	11	3	2	22	4	16,000	24.7
CAL	7	3	6	86	2	17,430	26.9
AA	7	3	6	57	3	20,880	32.2
UAL	4	1	2	50	2	10,540	16.2
Totals	29	10	14	48	8*	64,850	

\*Turbine: 707 & DC-8; Piston: DC-6, 7, 7B, Super Connie, Super C & G.

### MINNEAPOLIS-CHICAGO (353 air miles)

	No. of Flights	N.S.	Tur- bine	Per- cent	A/C Types	Seats Sold	% of Total
NAW	20	14	6	30	4	37,950	80.0
CAP	9	9	8	100	2	8,110	17.1
NOR	7	0	0	0	2	1,330	2.8
OZA	1	0	0	0	1	(D)	—
Totals	37	23	14	38	8*	47,390	

\*Turbine: Viscount & Electra; Piston: DC-3, Convair, DC-4, DC-6, 68 & Stratocruiser.

### NEW YORK-LOS ANGELES (2,451 air miles)

TWA	11	3	3	27	5	36,570	37.0
AA	8	4	4	50	3	50,830	51.0
UAL	6	1	1	16	2	12,170	12.0
Totals	25	8	8	32	8*	99,570	

\*Turbine: 707 & DC-8; Piston: DC-6, 7, Super Connie, Super C, G & 1649A.

### CHICAGO-MIAMI (1,188 air miles)

EAL	13	4	5	38	6	24,450	42.3
DAL	10	5	4	40	4	28,240	48.8
NWA	4	2	4	100	1	5,120	8.9
Totals	27	11	13	48	9*	57,810	

\*Turbine: DC-8 & Electra; Piston: Convair, DC-6, 7, 7B, Super Connie, Super C & G.

### NEW YORK-SAN FRANCISCO (2,571 air miles)

TWA	8	3	3	37	4	31,030	50.5
AA	5	2	4	80	2	11,580	19.0
UAL**	3	2	2	66	2	18,620	30.5
Totals	16	7	9	57	6*	61,230	

\*Turbine: 707 & DC-8; Piston: DC-7, Super C & G & 1649A.

\*\*Increased to six flights by March 1, four DC-8.

NOTES: All flight information is one way in direction shown. All traffic is "both ways" but includes only single carrier tickets sold (1st class and coach) and is derived from sampling reports to CAB for 4th Quarter, 1959. It does not include multiple carrier tickets, a portion of which was sold on these routes nor does it include tickets involving mixed fares, i.e. part 1st class, part coach/tourist. For simplification, only reports in excess of two one-way tickets or one roundtrip were recorded. D—Discounted account no nonstops.

## USAF Backs Jets for Cargo

The USAF at long last has set down specifications for what it would like in an optimum military cargo plane to be developed for use both by MATS and commercial airlines.

Obviously resembling nothing on the market today, it combines jet speed, boundary layer control-like takeoff performance and floor levels possible only with high-wing aircraft, to virtually demand a brand new article. Here are the specific design features suggested for the new transport:

Max. payload ..... 70,000 to 80,000 lbs.  
Nonstop Atlantic Payload ..... 40,000 lbs. minimum  
Nonstop Pacific Payload ..... 20,000 lbs. minimum  
Cruise speed ..... 440 knots (506 mph) min.  
Runway Requirement (over 50-ft.

obstacle at max. gross weight) ..... 5,000 ft.  
Loading provisions: (1) straight-in loading through tail (2) Truck bed height in loading configuration (40 to 54 in.). (3) Integral loading equipment. (4) Side cargo door. (5) Minimum cargo envelope—60 ft. long, 10 ft. wide, 9 ft. high.

Economy: Lowest direct operating costs desired. Generally, USAF expects costs as low as 3¢ per ton-mile are possible.



# A Pilot's Cure for Jet Problems

After 18 months, jet ATC bottlenecks, lack of instrument panel standards still plague pilots.

By ROBERT ADICKES

**WE CAN NOW LOOK** back on 18 months of jet operations by commercial airlines within the U.S. This introductory period has been successful beyond the manufacturers' most optimistic forecasts in the 1955-57 era and we now have a lucid picture of the real industry potential.

The phenomenal rate of passenger acceptance is a credit to be equally shared by airlines, manufacturers, and the Federal Aviation Agency. But what have we learned? How can we apply this new knowledge to forthcoming needs in order to continue this fine rate of progress?

The jet route bottleneck which exists from the middle of Kansas westward into Nevada caused by the lack of radar coverage has created a serious operating deficiency for the airlines. Frequently they must be "tunneled" below 31,000 feet, costly in fuel as well as passenger time. The FAA recognizes this problem and is asserting every effort to provide full radar coverage of the entire transcontinental jet route structure.

A measure of praise must be given FAA controllers. They have turned in a magnificent job under extreme conditions by expediting jet aircraft with a minimum of up-to-date equipment. FAA administrator E. R. Quesada has personally done battle with Federal airspace and communications agencies. Through his personal efforts tens of thousands of square miles of air space have been released for civilian operation and more radio frequencies have been allocated to solve difficult jet communications problems.

## Approach speed-up sought

Approach procedures for jets begin too close to destination, and the whole approach and landing sequence can be speeded up, by utilizing several proven, "state-of-the-art" devices not yet installed. By full installation of DME (distance measuring equipment) jet positioning can be compressed in time and space. In addition, it will be helpful if landing information is immediately available when the pilots contact the center frequency. This can be accomplished by simple closed-circuit TV to provide wind direction and velocity, altimeter settings and other data.

From the passenger's viewpoint, concern is less with advertised speeds than with the elapsed time of the trip. Many millions of dollars have been spent to increase jet flying speed where the net result can only reflect a savings of perhaps 35 minutes (for example on a flight from Chicago to New York) over propeller craft. All this is lost when the airplane must remain on a taxiway (engines running), for 35 minutes, awaiting gate space.

By utilizing pilot-controlled towing equipment for maneuvering these "beasts" on the ground, the effective gate space can be increased by 30% without lengthening the finger lamps and without long tiresome hikes so objectionable to the public. Today, the passenger walks more than 2,000 feet boarding and deplaning. By using towing equip-

ment provided with sufficient electrical power plus jet engine starting capabilities the noise, blast, and fumes are also removed from the passengers' loading area.

The New York Port Authority requires jet aircraft to be towed 1,000 feet beyond the passenger loading area. Unfortunately, towing equipment is incapable of starting the engines, therefore, the airplane, with all engines running, must be towed out by a complex towing bar attached to the nose wheel. This awkward procedure is cumbersome as well as wasteful in time and fuel—and it doesn't solve the noise and blast problems. There is a well documented need for adequate jet towing equipment.

Accompanying this article are photos of the Boeing, Convair and Douglas jet transport cockpits. From the remarkable similarity, the reader can see the progress made to date. However, many controls, systems, knobs, switches and buttons are not uniformly positioned. Much work remains to be done in this area, but the payoff is a safer operation, lower manufacturing costs, and savings in maintenance.

Commercial jet transports all fly with an ATC transponder operating for radar target identification. It is redundant to discuss the out-dated concept of "see and be seen," yet this is still the most reliable way to avoid a collision. Pilots' eyes automatically focus at three feet when scanning the thin air at high altitude, and it is difficult beyond description to avoid a collision when closure rates are more than 1,600 feet per second.

Unfortunately, many of the collision hazards existing between 25 and 40 thousand feet are military aircraft operating without effective transponder transmission.

There are numerous pilot reports of 707s and DC-8s given no warning of intruding aircraft by radar nor any traffic information by ARTC when a KC-135 refueling B-52s appears almost by magic. Questioning radar controllers about those "bogey" targets occasionally evokes a report of a "skin paint" return not clearly identifiable. This additional task must burden the indefatigable Mr. Quesada—to insure full compliance by the military and operating transponders on all of their jets.

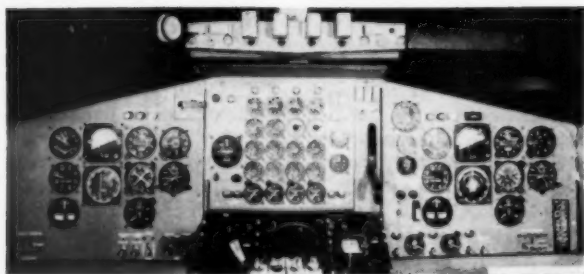
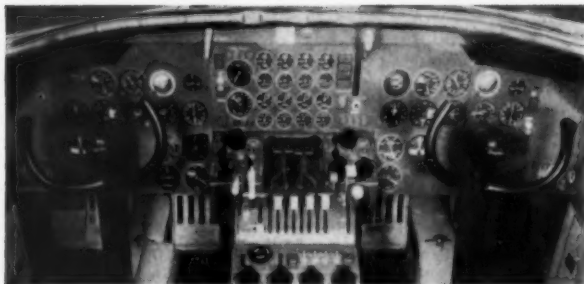
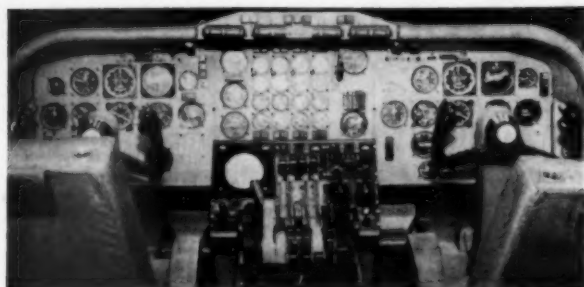
Each commercial jet transport is equipped with the

## ABOUT THE AUTHOR

Robert Adickes is president of Aviation Consultants, Inc., and a senior command pilot with 18 years of airline experience. He is currently on duty with a major U.S. transcontinental airline. His Pasadena, Calif., firm employs a group of pilot-associates to provide consulting advice to firms engaged in the commercial aviation market. Adickes has served on numerous design, evaluation and accident investigation teams and currently is chairman of the Convair 880 flight evaluation committee for the Air Line Pilots Assn.



## Can You Name the Cockpit?



Sharp-eyed pilots will note distinguishing features of three "competing" cockpits. For solution, see page 80.

KIFIS (Kollsman integrated flight instrument system) which constantly provides corrected altimeter and air-speed information. This system guarantees accuracy of plus or minus 100 ft. and 35,000 ft., but this is scant comfort to the airline pilot who is fully aware of 3,000 ft. altimeter errors which can exist on military aircraft not equipped with an air-data correction system. These KIFIS computers cost approximately \$18,000 per airplane, and the military budget does not permit this essential safety improvement.

One of the biggest unanticipated costs to hit the airlines has been the heavy flight training costs of upgrading pilots to jets. Two 707s were completely destroyed—with many crew fatalities—during the first year of operation. To use a training aircraft which costs \$1,600 an hour to operate, in addition to a loss of another \$1,000 in net revenue profit, has caused airline management to carefully scrutinize their training requirements.

In addition, the FAA is applying more stringent training regulations to copilots on Jan. 1, 1961. This additional qualification training is estimated to cost the airlines another \$28 million over and above the cost programmed and experienced during the first year.

Progress is being made, however, to help lower training costs. One of the major aircraft manufacturers is develop-

ing an adequate jet trainer capable of simulating—in flight—most of the procedures necessary for training.

This is another logical step between the valuable ground-locked simulators and the full scale flying trainer. The concept is not new, but has not heretofore been applied to jet airline training.

A comprehensive study shows that 85% of procedures required by the FAA to rate a pilot on a jet transport can be accomplished on a smaller jet with properly designed cockpit and with comparable power and wing loading. The savings can result in profits of more than \$6 million annually to the airline industry.

The first year's operation has shown that runways available for takeoff are often marginal. This point is magnified by a high percentage of the flights being long-range nonstop trips. In the future, at least 70% of all flights will require longer runways for landing than for takeoff. This fact was not fully considered at first and is only now being realized. An effective runway deceleration system is needed which will be adaptable to all climates and weather conditions. A basic design feature is that it must include no mechanical, electrical or ballistic triggering devices.

Such a system, to be fully acceptable to commercial jet transports, must have a 99% reliability factor and must be equally effective for a wide range of aircraft types, sizes, and weights. Furthermore, it must not add additional weight or mechanical complexity to the airplane.

This is a large order, but the concept is not impossible. Scale studies and test evaluations have proven the basic idea—and more advanced testing is now being conducted. Such a runway installation—inert but always alert—is practical and reasonable. One of its outstanding advantages is its ability to solve the undershoot accident. More than 70% of Air Force accidents involving jets on takeoff or landing have been undershoots.

The most significant area for immediate improvement is in the area of equipment proven through years of evaluation but not yet installed at airports. Among such devices are high intensity stroboscopic approach lights providing 30 million candlepower for 1/3000th of a second without blinding the pilot, high intensity runway lights, dual instrument landing systems, and emergency equipment on the airports.

Recent disputes between airline pilots and the FAA were healthy in the sense that they indicate a vitality and growth in aviation. When carried too far, however, it does not help the industry for one segment to flail the other in public, for this can damage public confidence in air travel when just the opposite is needed.

The debate presented an exaggerated picture to the public. Actually, there is genuine respect and cooperation between airline pilots and the FAA.

As Mr. Quesada has pointed out, "the majority of professional airline pilots are highly qualified with an inordinate sense of responsibility and are not given to carelessness, neglect, or incompetence." Isolated incidents given a big play in the press tend to create a broad hostility between the two groups which is not supported by fact.

Many FAA regulations recently imposed at Mr. Quesada's direction have met with wholehearted support by airline pilots. Notable are the more stringent requirements for co-pilots and radar equipment for the hundreds of transports not now equipped.

"Pete" Quesada has taken over the slack reins of the old CAA—and a revitalized FAA has been sparked by his aggressive action. Pilots, by nature, recognize and appreciate the need for a vital "doer" like Quesada. He has gained a widespread respect among his fellow pilots, who know you "can't make an omelette without breaking eggs."

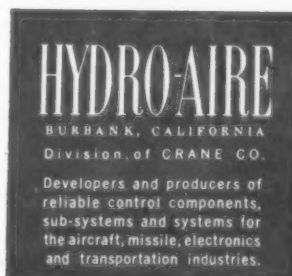
The excitement cleared the air and if we all pitch in and work together we can give the jets what they need.



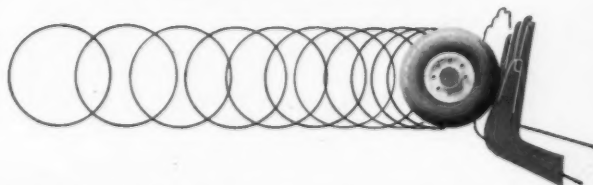
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## Training

# At Last! A Good ILS Approach Trainer

Pilots are individualists, rarely agree on anything, says EAL safety chief, but their enthusiastic response to Dalto has been astounding.



By CAPT JOHN F. GILL

**T**HERE HAS BEEN considerable talk about "all-weather" flying since World War II. Recent advances in the technology of poor visibility/low ceiling flight operations have brought the once-remote era of "all-weather" operations very close to actuality.

Major developments have brought about improved aircraft instrumentation, airport approach and landing aids, both visual and non-visual, and more realistic and sophisticated training methods. The latter are aimed at bringing the human element—the pilot—into line with technical advances.

Radio-navigational aids have achieved a high standard of accuracy. Flying solely on instruments—blind flying as it was first called in 1929—a pilot can bring his aircraft across an entire continent and then line up precisely on an extended centerline 200 ft. above the landing runway.

Scallops (or bends) are being taken out of localizer and glide slope transmissions, resulting in harder beams. It is expected that a buried glide slope antenna will soon provide an accurate beam all the way to touchdown.

The critical transition from gauges to contact flying has been aided by standardized configuration "A" approach lighting patterns equipped with sequence flashed condenser discharge lights or, more recently, long-sought narrow gauge, flush or semi-flush runway lighting.

Idlewild Airport possesses this country's first commercial narrow gauge lighting system. This, I believe, will largely eliminate the problem of aviation's infamous "black hole."

Until recently, however, training and practice for the low weather approach has been conducted under less than ideal conditions. There were several reasons for this:

1. Costs of such training in aircraft such as the DC-8 or Boeing 707 are at least \$1,500 per hour.
2. Congested traffic at larger airports makes practice approaches impossible since training flights assume their place in line on already crowded flight holding patterns.
3. The only realistic time to practice instrument approaches would be during instrument weather. During low visibility, airspace around most airports becomes critical, making training flights impractical. Furthermore, government and company regulations specify that most training must be conducted under VFR conditions.

Hence, for training in low weather approach, airlines have depended upon training flights during good weather, generally with some type of hood. On-the-ground training has been conducted in instrument trainers or simulators.

Using a hood while flying with normal visibility adequately duplicates the non-visual, electronic portion of the ILS approach. The hood limits the pilot's range of vision to the instrument panel; he cannot see through the windshield. He must shoot an approach using the gauges only.

At a given altitude in the approach, the hood is lifted, simulating the transition from instrument to visual flying. This is where hood-type training falls short. After the breakthrough, generally simulated at an unrealistically high altitude, the pilot has a full daylight view of the runway, a prospect he would never encounter during actual ILS conditions.

More realistic training has been accomplished with electronic flight simulators. Sitting in model cockpits, with fully instrumented gauges and working aircraft controls, pilots can fly missions strictly by instruments.

Until recently, even on-the-ground trainers were not entirely realistic. After carrying out an approach to the breakthrough point at approximately 200 ft. altitude, the exercise ended.

Pilots will agree that there is a vast difference between a training instrument approach which they know in advance is to cease at a certain minimum altitude and one which, under low ceiling and visibility conditions, they must decide whether to complete or abandon.

The difference in mental outlook and planning under the two situations is significant. One involves comfortable foreknowledge; no decision is required. The other requires heightened concentration due to impending need for a rapid command decision.

I believe, therefore, the recent addition of visual realism to simulator training, via closed circuit television, is a most significant step toward all-weather operations and is a boon to pilot training and maintenance of ILS proficiency.

For the first time, pilots can view the progress of training exercises as they carry out an approach, touch down on the runway and come to a full stop. They may also take off with full-vision realism.

Two basic types of visual simulation are available:

VFR—This permits taxiing, visual take-off, circling and landing under typical daylight visibility. Displayed on the viewing screen is a replica of the airport with all buildings and taxiways as they appear during daylight.

### About the Author

Capt. J. F. "Johnny" Gill is Eastern Air Lines' new Director of Flight Safety. He is probably the industry's outstanding contributor to training for the low-weather approach. Formerly Eastern's chief pilot at Newark, he is a 36-year veteran pilot. A flying cadet classmate of FAA Administrator "Pete" Quesada back in 1924, he joined EAL in '30 and became a chief pilot 10 years later. He is now serving on FAA's airline advisory committee, is a specialist in ILS and blind landing systems, airport runway lighting and safety's biggest problem area—the approach.



**IFR**—This type of visual simulation represents restricted visibility conditions throughout. Displayed on the viewing screen are only those cues necessary during the visual portion of an instrument approach and landing with 300 ft. ceiling and a half-mile or less visibility. The conditions before, during and after the critical breakthrough are realistically simulated. Omitted are such items as terrain, buildings and taxiways, because in addition to being unrelated to the problem, usually they are only partially seen or are invisible.

Eastern Air Lines decided to acquire the IFR-type visual attachment to be used in conjunction with existing instrument trainers at all pilot training centers, and ordered six Dalto visual flight simulator attachments and has taken an option on two more.

It has been my experience, after more than 30 years of commercial flying, that an ILS approach requires the greatest concentration and precision and is one of the most critical techniques of flying. It requires absolute adherence to the localizer, glide slope and speed control. If all pilot training is conducted under simulated instrument conditions, habits will be transferred to VFR operations which, generally speaking, permit considerable leeway, although jet operations call for critical tolerances during approach and landing.

Visually simulated flight training permits pilots to train themselves. An inexperienced pilot or a veteran not used to frequent low ILS approaches will promptly recognize faults in technique when training with a visual attachment. He will become eager to repeat and correct faulty techniques.

The first Dalto Simulator was attached to a Curtiss-Wright P-3 Flight Duplicator at EAL, Newark Airport.

Since its adoption as a regular training requirement early in 1959, more than 1,800 pilots have undergone training with it. Although principally Eastern captains and co-pilots, guest fliers from many other airlines and countries—TWA, PAA, AAL, Alitalia, KLM, SAS, Air France, Capital, United, RCAF, U.S. Air Force, U.S. Navy and the FAA—have test flown the Dalto.

Critiques have unanimously favored the visual aid attachment. Initially, Eastern pilots were asked to turn in written reports after trying the Dalto-equipped instrument flight trainer. Most were favorable.

### Dalto well received

It has been my experience that pilots rarely agree on anything. We're individualists from way back and have our own ideas on just about everything, especially a new device. Yet the enthusiastic response of Eastern pilots to the Dalto was astounding.

Said one, "For a fellow like me, who flies long, non-stop flights, low approaches are few and far between and some of us become rusty at times. It would indeed be nice to know that we can sharpen up any time we feel it desirable. I think the investment will pay off in cash savings accrued through increased piloting performance, by turning the instrument flight trainer into something the pilots would like to use because so much can be gotten from the training."

Another had this to say, "Next to the airplane, this is it! That is, bearing in mind that there are demonstrations possible with this device that one would be foolish to demonstrate with an actual airplane."

A third said, "With respect to landings, there can be no quibbling with the trainer operator as to whether the approach was good, bad, passable, or what have you. If there are any faults, you have only one person to look to, yourself! There is little doubt that this device will make people work harder to perform a more precise



How a pilot sees runway in ILS approach with Dalto simulator attachment to flight simulator. Device was developed by Ward Davis, president of Dalto Corp., Jamaica, N.Y.

job. It's analogous to the carrot hung on a pole in front of the horse's nose. With Dalto, we now have a carrot. With the former system of judging a trainer approach, i.e., the crayon on the plastic sheet, the aircraft will have arrived at the threshold, but the heading may be such that a landing would be impossible. With the Dalto visual flight simulator attachment there is no question and the pilot can be his own taskmaster."

Regular exercises in a Dalto-equipped trainer result in considerably faster flight instrument scanning speeds for all pilots. Instrument scanning speed required during an ILS approach is about three to four times greater than the speed necessary during enroute flying.

Many of today's aircraft are equipped with automatic approach devices. However, there is considerable pilot resistance to use of automatic couplers, particularly during low visibility conditions. The reason for this is understandable. Most pilots, particularly those flying longer haul trips, get little opportunity to make ILS approaches; they desire and need the practice. With realistic low-visibility simulation available, these pilots can, regardless of weather, safely practice instrument approaches under conditions as low as zero-zero.

Such training and opportunity for practice boosts confidence not only in one's ILS proficiency but also in ability to monitor automatic couplers and, if necessary, to take over and complete at any time during the approach for landing.

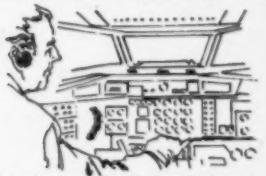
Improved training facilities for low weather approaches will be reflected in improved reliability (safety) of flight operations, the common goal of everyone connected with this dynamic age of flight.

Inadequately equipped airports delay improved service reliability. This is true at the federal and local airport level. The FAA's expanded program for approach and landing aids is to be commended. It should be accelerated. At the local airport, adequate runway and taxiway lighting and marking should be installed. Too frequently accidents have occurred which can be directly laid to inadequate approach, landing and taxi aids.

Give the pilot the necessary tools, and training in their use and reliability will be assured.



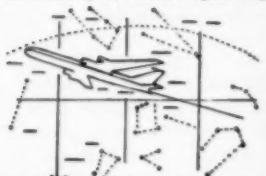
Research and Development Engineering



Flight Instrumentation System Engineering



Missile and Space Vehicle Engineering



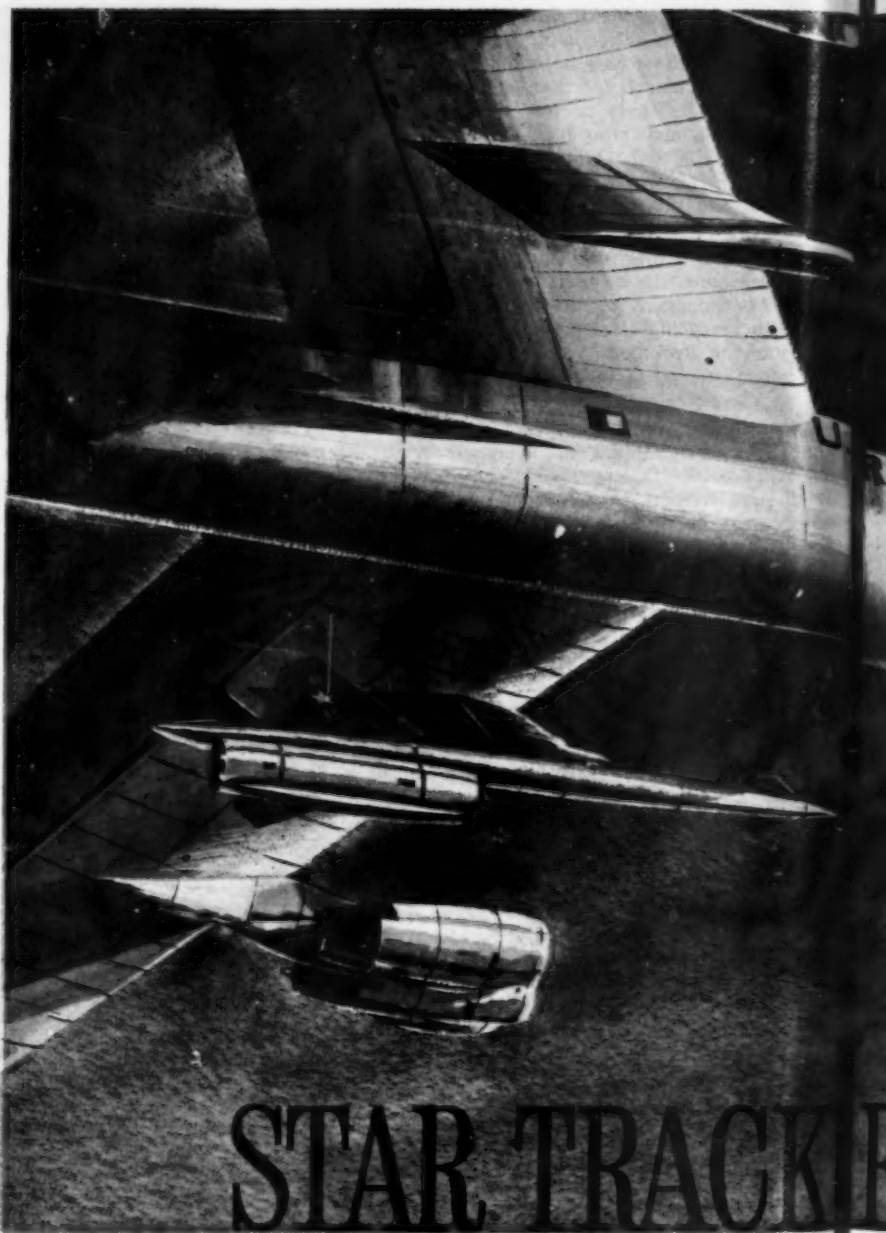
Automatic Celestial Navigation Engineering



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How do you make a Hound Dog point? Set him straight from a star.

Helping to launch the deadly air-to-ground Hound Dog missile represents one of the many exciting new areas in which you'll find advanced Kollsman engineering talent assuming a leading and critical role.

This calls for the precision Kollsman Astro Compass to help guide the B-52 mother ship and for the Kollsman Star Tracker to help launch the Hound Dog missile accurately.

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APRIL 1960



# U.S., Britain Narrow Gap on Jets

An on-the-spot interview by AIRLIFT'S Anthony Vandyk with  
R. E. Hardingham, Chief Executive and Secretary, and  
W. Tye, Chief Technical Officer, British Air Registration Board



TYE

The British Air Registration Board is a private company, but its constitution is established by Act of Parliament. The British government delegates its responsibility for certification, airworthiness and licensing matters. The Board has 18 members, non-paid, four each from representatives of operators, manufacturers, and insurers, and four co-opted independent members. Two members are appointed by the Minister of Aviation. With a staff of 600, the Board has 16 offices in the U.K. and nine overseas. It also acts as an adviser to several foreign governments.



HARDINGHAM

*• In which areas are there differences between American and British thinking on airworthiness matters?*

There are now very few. Relations between ARB and FAA are most cordial. There was, for a number of years, a great difference in performance scheduling and requirements. We had the so-called "rational" system as against a rather more old fashioned U.S. system. After some years of discussion our American friends have at last come around to the British form of performance requirements. This is a great step forward in agreement although minor differences between the two performance codes are still under discussion.

*• What was the effect on dealing with the BOAC version of the Boeing 707?*

Because in one or two aspects we are more conservative, the performance of the 707 is written down slightly. This does not prevent acceptance of the aircraft, but slightly alters its performance scheduling. The 707-436, however, did not meet British handling requirements.

*• What do you mean by handling requirements?*

For example, we expect a certain handling performance with one and two engines inoperative. This determines the general control ability of the aircraft. British requirements are a little more searching in respect of the qualities that affect the pilot's ability to control the aircraft in adverse circumstances. Control forces are involved—we have fairly strict upper limits to the maximum allowable forces. Stability characteristics are another aspect. The 707-436 has had to meet certain handling requirements which would not be applied directly by the American requirements.

*• Do you see eye-to-eye with the U.S. on temperature accountability?*

You might say they now see eye-to-eye with us. This was one of the very important differences which for so many years stopped us from closing the gap between our two codes. We believed that it was necessary to take direct account of temperature on a day-to-day operational basis. The United States for many years built into their basic

performance requirements some account of temperature but it had the result that on a day that was cold the aircraft had an excessive performance and on a day that was hot it had a less than satisfactory performance. Thus while there was this difference it was very difficult to compare the two codes.

*• Was there any other major difference between U.S. and British performance codes?*

Yes, The requirements for rate of climb. The U.S. code required that rate of climb be proportional to "stalling speed squared." That means that an aircraft with a 50 mph stalling speed would have to have such and such a rate of climb while one with twice the stalling speed, 100 mph would, under the American system, have had four times the rate of climb. On the British basis the rate of climb was proportional to the stalling speed so that if you double the stalling speed you double the rate of climb. Thus one could obtain similarity between the two sets of requirements at a particular stalling speed. If you went above that particular figure the U.S. requirement became tougher than ours but if less than the particular stalling speed our requirement became tougher than theirs. The U.S. now accepts basically that the rate of climb is directly proportional to the stalling speed.

*• Do you agree with American thinking on emergency exits?*

Yes, our requirements are virtually identical. On both sides of the Atlantic we appreciate that a large number of small exits is less useful than a smaller number of larger exits. There is evidence to show that passengers will make for big doors in an emergency and however simple the window exit is it seems to present a problem to the passenger. Moreover, you might find yourself faced with the prospect of going head first through a narrow exit 30 ft. above the ground. We think that exits of big aircraft should be on both sides of the fuselage and that they should be located forward and aft, the aft generally being more useful. There is also a case for some small exits over the wing so that passengers can climb out onto the wing. This is of importance for ditching.



• *How about fire precautions?*

There has been some difference in the past. We have always had a liking for automatic crash operation. That has not been the United States view. However, we are reviewing fire and other crash precautions, in the light of turbine engine experience. Engines now are being located in the tail of certain aircraft and this also makes a difference.

• *How do you feel about emergency oxygen supply?*

This is related to the integrity of the pressure cabin. We feel that failure must be as remote as, say, a wing falling off—it must not happen. This must certainly apply over 40,000 feet. At the altitudes where supersonic aircraft will fly oxygen masks would be of no help in the event of sudden decompression. The occupants would be unconscious in a matter of seconds, before they could put the masks on. The fundamental approach must be, first, not to have any catastrophic explosion and, second, to insure that minor leaks such as those caused by seamed rivets bursting do not have serious consequences.

• *Do you visit plants to investigate aircraft that have not been ordered by British operators? For example, have you had a look at the DC-8 and Convair 880?*

The Air Registration Board is a free agency and if we are invited to visit any plant we welcome the opportunity. We have not made a formal investigation of either aircraft you mention but we seek to keep abreast of all important new models throughout the world. In some cases, for example, the Fokker F-27, we became closely involved because there was much British equipment in it. Both FAA and the Dutch looked to us to certificate the engines and landing gear.

• *How many special conditions do you require on the Boeing 707-436?*

The total is 22. This compares with 130 asked by FAA for the Britannia and 26 for the Viscount. However, in the case of the Britannia it was at that time the U.S. approach

to list differences in requirements. We showed 75% of these could be met without any change. The attitude now is to accept that although the requirements may be different in wording, if it can be shown that the intent is the same and the result is more or less the same there should not be a special condition. There were only 22 special conditions on the Boeing 707-436 because we did not look at the differences in requirements—we looked at the things which we felt to be of real significance. The FAA looked at the Viscount in the same way.

• *Why was there a delay in certificating the 707-436?*

We were unable to accept certain handling features. Consequently Boeing decided to incorporate certain modifications—extension of the fin, fitting of a ventral fin and increase in rudder boost. We did not, of course, define the modifications—they are Boeing's.

• *What problem areas are under discussion by you and FAA?*

One is new engine ratings for multi-engined helicopters. Another is landing distances—these remain as the part of performance requirements most in need of general revision. Both of us are aware of the need for this. There is a tremendous field ahead—supersonic aircraft, VTOLs, automatic landings and take-offs.

• *Do you think that U.S. and British airworthiness codes should be identical?*

Although for many obvious reasons it is highly desirable that they should, where there is a legitimate reason for a difference of approach, in those circumstances it would be foolish to seek unanimity too quickly. This is because when there is a good reason for two opinions, usually only operational experience will show which is the right approach. If you falsify the situation by one side bowing to the other's views to start off with, you never know. If therefore you can afford to maintain your differences for a period of time one side or the other can establish that its system has proved to be the better.

## F-27s Spark Bonanza's Record Traffic

By ERIC BRAMLEY

LAS VEGAS—More traffic, less subsidy.

This forecast, made by Bonanza Air Lines when it raised money to buy Fairchild F-27A turboprops, is coming true. It's a good example of what a new airplane can do for a local service line.

BAL's revenue passenger-miles jumped 31.5% last year, and F-27s weren't in service for the entire 12 months. Three went into operation Mar. 29, three more Oct. 25. It might be expected that adding three planes so late in the year would increase available seat-miles so suddenly that passenger-miles wouldn't have a chance to keep pace. But the year's passenger-mile gain of 31.5% was close to the seat-mile increase of 32.6%. During the last nine months of 1959, passenger-miles were up 34.5%; in the last six months they increased 40%. And this was not a year of route expansion.

Like most locals, BAL wants new routes and wants to drop some stops that aren't producing. Given some of these routes, plus more flexibility on the present system,

management is convinced it can eliminate subsidy.

In addition to the six 40-passenger F-27As (powered by Rolls-Royce RDa7 engines of 2105 t.e.h.p.), BAL has 10 DC-3s, one used exclusively for charter, and plans to sell three. Four more F-27As are on option, two for delivery in mid-1960, two later in the year.

BAL's vital statistics: 25 cities served, 470 employees, 2,302 route miles in four states (Nevada, Utah, Arizona, California), average stage length of 121.8 miles, average yield per passenger-mile of 6.7¢. Of the 13 local lines, it is 11th in revenue miles flown and number of originating passengers, 10th in passenger-miles and, because of the F-27s, sixth in average passenger load.

During April-November, the first eight months of F-27 service—and with only three of the planes operating for seven of the eight months—the F-27s' average passenger load was 18.8, while DC-3s produced 8.21, for a system average of 12.6. In the same 1958 months, an all-DC-3 operation showed 10.3.

BAL's F-27 utilization has now risen to a respectable 6 hrs. 20 mins. daily, and it is operating 75% of seat-miles and 65% of scheduled miles with the new equipment.

On the 40-place plane, BAL's average available seats for sale total 37.8. Principal reason for this is heavy fuel loads on long nonstops. Phoenix-Salt Lake City, for example, is a 508-mile trip; seats are restricted to 35 southbound, 34 northbound. Of BAL's 7,880 daily scheduled miles, 2,032 are on Phoenix-Salt Lake.

Break-even load factor on the F-27 is 20-21 passengers per mile. Already at 18.8, BAL needs less than three more to reach that goal.

F-27 direct operating cost from April, immediately after the first three planes entered service, through November, a month after the last three were added, was 79.6¢ a mile. For the 12 months ended Mar. 31, 1959, the all-DC-3 fleet had seat-mile cost of 5.14¢. For April-December, 1959, the mixed fleet showed 4.95¢. BAL hopes that at least two developments will reduce operating cost: (1) longer time between engine overhauls, (2) lower insurance rates as the plane piles up more hours and insurance companies get a better idea of what partial damages cost.

BAL has had no major problems with the F-27. There has been some trouble with what v.p.-operations M. W. "Woody" Reynolds refers to as "nickel-and-dime items"—pneumatic system trouble, compressor failures, nose wheel steering, cooling system.

So far, BAL has had no engine failures (7,607 hrs. flown through Dec. 31). The Dart powerplants are overhauled by Continental Air Lines, propellers by General Electric. Engine overhaul is at 1400 hrs. and eventually will reach 2000. Wing center section overhaul has been set at 8000 hrs., airframe at 10,000.

Operations have been aided by FAA-granted increases in the F-27's weights. Takeoff weight was upped from 36,225 lbs. to 36,500, landing from 34,500 to 36,000, the latter particularly helpful on short hops.

BAL has found that it is better off economically when operating the F-27 at altitudes of 13,000 to 16,000 ft., instead of 20,000 to 25,000. Reason: the additional climb to higher altitudes outweighs the fuel economies realized at those altitudes. The F-27A is averaging about 220 gals. per hr.; kerosene costs an average of 14¢ per gal.

BAL's F-27 operations have been aided by the thorough

pilot training course it conducted, at a cost of over \$1,000 per pilot. F-27 pilots receive \$299 to \$349 a month more than DC-3 pilots. The airline has 80 pilots and copilots, 60% of whom are domiciled in Phoenix. Average monthly flying time is 82.5 hrs.

For the 12 months ended Nov. 30, 1959, BAL's subsidy was \$2,323,000 and mail pay \$41,000. The company has been on an open rate since July 1, 1957, and the subsidy is that needed to break even and pay interest. The open rate was made necessary by expansion—addition of the Apple Valley route in mid-1957, Phoenix-Salt Lake (the last big extension) in early 1958, and purchase of F-27s.

### Subsidy on the decline

New planes cost money, new capital costs money, and activating new routes is expensive. Thus, it was inevitable that BAL's subsidy bill would go up before it came down. Now, however, management believes the downward move has started. Subsidy will be less in 1960 than in 1959, and further reductions will be made in the following years.

If some of the routes for which it has applied are granted, and present operating authority is liberalized, subsidy will disappear, officials predict. Among the new routes sought are Las Vegas-Oakland/San Francisco, nonstop and also via Fresno; Las Vegas-San Diego nonstop and via Palm Springs; Reno-Oakland/San Francisco via Sacramento. It also wants nonstop rights on some routes presently served: Phoenix-San Diego, Phoenix-Los Angeles, San Diego-Los Angeles, and Las Vegas-Los Angeles. On the latter segment, BAL recently received CAB permission to make only one stop (Ontario/Riverside) and expects this to help substantially. But a nonstop would produce a sizeable yearly profit, it believes.

There are trunklines on these routes where BAL is seeking nonstops, and they oppose the local line's bid for more liberal authority. But BAL's contention is that the trunks, with bigger turbine equipment, will become less and less interested in giving frequent service on segments under 500 miles.

If CAB approves, BAL will buy the routes (but not the equipment) of Apache Airlines, intrastate operator, which flies Phoenix-Tucson, Tucson-Nogales, and Tucson-Ft. Huachuca, some 230 miles.

The airline is currently involved in a legal situation which may be of more than passing interest to all other carriers. In 1958, the temporary certificate to serve Hawthorne, Nev., expired, and BAL dropped the stop several months later because it wasn't producing. It has not applied for renewal of Tonopah, Nev., another light traffic point. Now the Nevada Public Service Commission claims jurisdiction, demands resumption of service at Hawthorne and increased schedules at Tonopah. BAL, claiming that regulation of interstate air service is the exclusive responsibility of the federal government, is fighting the case in court.

Edmund Converse, who started the company as an intrastate Reno-Las Vegas operation in 1946 and who has headed it ever since, anticipates no difficulty in financing purchase of four more F-27As. A government-guaranteed loan of \$4,324,500, plus a 470,000-share stock issue furnished funds for the present airplanes. The loan will be paid down sufficiently so that it can be increased—and remain under the \$5 million ceiling—to cover two aircraft. Other financing will be equity or debenture or both.

Board chairman and president Converse at one time held well over 50% of BAL's stock, at a time when there were only 15 stockholders. The 470,000 additional shares increased stockholders to 2,200 and reduced Converse's interest to 25.8%. He likes it that way. "You have a lot more people interested in the company—at lot more people selling it."



Here's how Bonanza's operation has shaped up since introduction of three F-27As in late March, 1959. Average number of passengers per mile hovered around 19 for the F-27 through the first seven months, dropped off to about 16 with the addition of three more turboprops in late October. Note sharp rise in both passenger miles and revenue miles flown since F-27 introduction.

# 27 million jet flight hours

... demonstrate General Electric's leadership  
in the design and manufacture of jet engines.

From the historic moment in 1942 when twin General Electric I-A engines powered the first jet flight in America, G-E engines have logged 27 million jet flight hours. And, G-E jets like the J33, J35, J47, T58, J85, J79, and CJ-805 have consistently set new standards of performance and reliability.

Today, a General Electric engine:

- Powers the aircraft which has possessed the world's speed, altitude and time-to-climb records all at the same time—an unprecedented triple crown.
- Shares in the Collier Trophy for "the greatest achievement in aviation in America" ... during 1958.
- Has been chosen to power the world's newest and fastest commercial jetliners and the first American turbine-powered commercial helicopters.

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# 27 million jet flight hours mean

## *Reliability*

# for air-breathing weapon systems

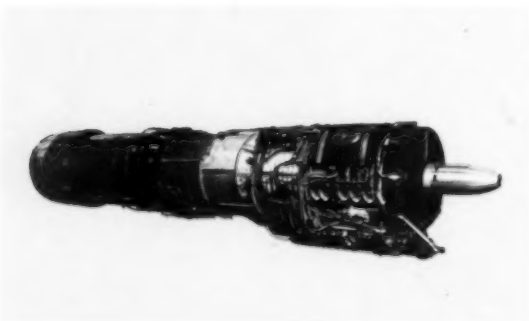
For almost two decades jet thrust has been increasing rapidly. G.E. has helped lead the way. Each new G-E engine has added to a remarkable record of reliability. Today, the J79-powered Lockheed F-104 has established an outstanding in-commission rate with USAF.

Sea forces will soon be strengthened by the McDonnell F4H and the North American A3J—the fastest, highest-flying aircraft in Navy history.

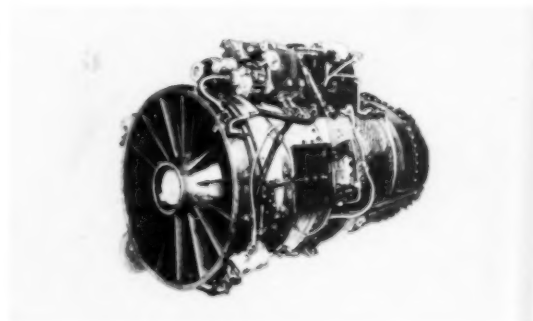
USAF's fastest, highest-flying bomber, Convair's B-58, is J79-powered. And, USAF's J79-powered Lockheed F-104 has held simultaneously the world's speed, altitude, and time-to-climb records—an unprecedented triple crown.

At the other end of the flight propulsion spectrum, G-E small gas turbines will soon enter operational service with the Air Force and Navy. The Navy's newest ASW and utility helicopters will be powered by the T58, which has demonstrated its reliability in thousands of demanding test hours.

The high performance J85 turbojet will soon enter USAF service powering McDonnell's GAM-72 decoy missile and Northrop's T-38 jet trainer.

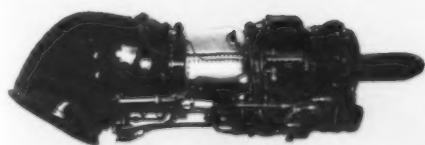


**J79** After more than three years of production, G.E.'s J79 remains the most advanced U.S. production turbojet. The record-breaking J79 provides more than 15,000 pounds of thrust, yet some models weigh as little as 3200 pounds. J79-powered aircraft have logged considerably more than half the world's Mach 2 time. Six Mach 2 air weapons are J79-powered: McDonnell F4H Phantom II, North American A3J Vigilante, Convair B-58 Hustler, Lockheed F-104 Starfighter (all pictured in main illustration), Grumman F11F-1F Super Tiger, and Chance Vought Regulus II missile.

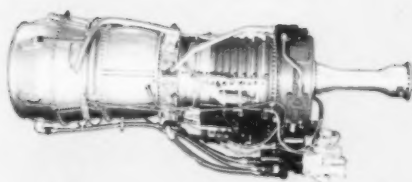


**J85** Advanced aerodynamic and mechanical design make G.E.'s J85 turbojet the highest thrust-to-weight ratio powerplant in its class. Weighing just 525 pounds and delivering 3850 pounds thrust, the reheat J85-5 powers Northrop's T-38 Talon supersonic trainer (pictured in main illustration) and N-156F Freedom Fighter (right). Another J85 version (above), which weighs 325 pounds and produces 2450 pounds thrust, is in production for the McDonnell GAM-72 decoy missile (right).





**T58** The T58 brings important benefits to helicopters—increased payloads or range, faster cruising speeds, greater endurance. Engines shipped have averaged significantly better than guarantees of 1050 shp, 0.64 SFC, and 271-pound weight. A 1250 shp growth version enters production this year. T58 has been flight tested in single and twin engine helicopters including Sikorsky's HSS-1F, HSS-2 (left), and S-62; Kaman's HU2K (left); and Vertol's YHC-1A and H-21D.

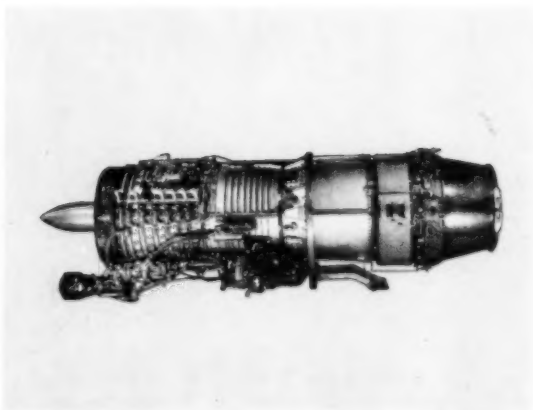


**T64** Low SFC and attractive power-to-weight ratio make G.E.'s versatile T64 turboprop/turboshaft ideally suited for a variety of aircraft. Among them: helicopters and fixed wing designs (right), skycranes, new VTOL/STOL designs. Turboprop configurations, with gearbox above or below centerline, deliver 2570 eshp at .522 ESFC. Turboshaft versions produce 2650 shp at .506 SFC. All models have common power sections, differ only in gearing and accessories.

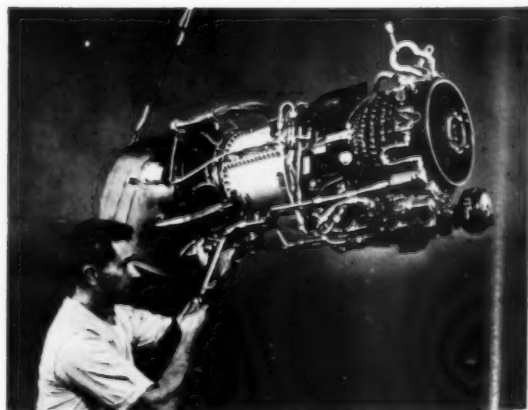


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27 million jet flight hours mean  
*Thoroughly Proven Powerplants*  
for commercial aviation



**CJ-805-3** G.E.'s first commercial engine, the CJ-805-3, enters airline service this spring. It will provide the power to carry passengers in Convair 880 jetliners at 615 miles per hour. The CJ-805 weighs 2800 pounds, delivers more than 11,000 pounds of thrust. It is 110 inches long, 32 inches in diameter.



**CT58** The CT58 is the first U.S. turboshaft to be FAA-certificated. It will power the twin-turbine Sikorsky S-61 and Vertol 107 (both in main illustration above) which begin passenger service next year. Sikorsky's CT58-powered single-engine S-62 is being offered to helicopter operators and corporations.

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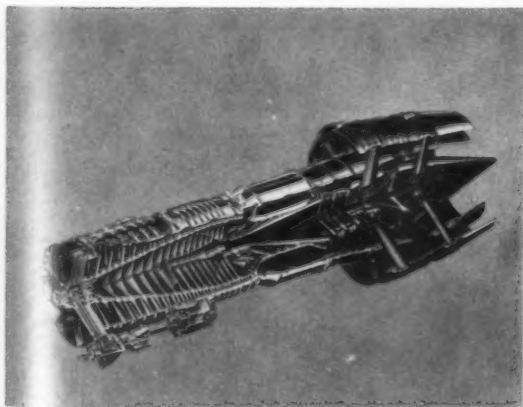
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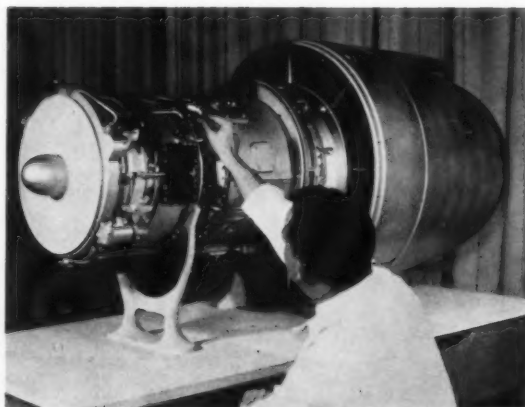
G-E engines will be the most thoroughly tested yet to enter airline service. For example, General Electric's CJ-805-3 flight test program was the first of its kind ever undertaken by a U.S. manufacturer at his own expense to test a commercial turbojet under flight conditions. The CJ-805 powered Convair 880 (top) has exceeded all of its performance guarantees and performed reliably in flight test. Delta Air Lines' first Convair 880 established speed records on its maiden coast-to-coast flight.

Jetliners powered by CJ-805-3 or -23 engines have been ordered by American Airlines, Avensa (Venezuela), Capital Airlines, Civil Air Transport (Formosa), Delta Air Lines, REAL (Brazil), Scandinavian Airlines System, Swissair, and Trans World Airlines.

At the other end of the power spectrum: America's first turbine-powered commercial helicopters, already on order by all three of the nation's major helicopter airlines, will be powered by G-E CT58 engines. Next natural step: turbinization of helicopters and transports owned and operated by industry.



**CJ-805-23** General Electric is flight testing its leased Boeing 707 with aft-fan CJ-805-23 engines. When tests began, it marked the first time an engine manufacturer had test flown a turbofan engine as the primary powerplant of an aircraft. The twin aft-fan engines are performing reliably—proving themselves prior to airline service. CJ-805-23 engines will power the Caravelle VII and Convair 600.



**CF700** Compared to turbojets in its class, the CF700 turbofan will provide higher thrust per dollar, greater range, shorter take-off, and less noise. The CF700 will combine the proven J85 gas generator and a scaled-down version of the CJ-805-23 aft-fan to produce 4000 pounds sea level thrust at 0.69 SFC. Flight-worthy CF700's are scheduled for April, 1961, with FAA-certificated engines available in February, 1962.

# 27 million jet flight hours mean *Greater Capability* for tomorrow's aerospace missions

Twenty-seven million jet flight hours form a solid foundation upon which General Electric research and development can build to meet the needs of the near and distant future.

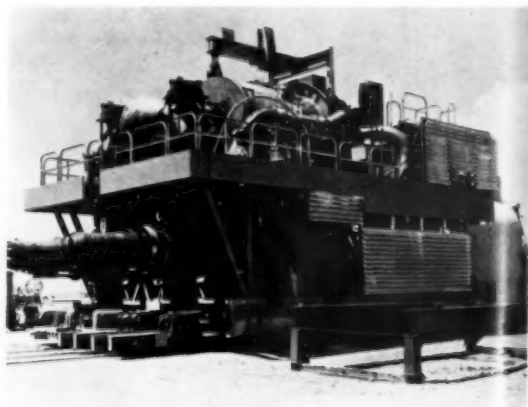
The Mach 3 North American B-70 Valkyrie bomber, for example, represents the next stride forward for manned aircraft. G.E. is developing the highly advanced J93 engines which will power it.

General Electric, under contract with USAF and the AEC, is developing a nuclear propulsion system for America's first nuclear-powered aircraft, as revolutionary as the B-70.

In rocket, VTOL, and space power and propulsion, systems now being investigated at General Electric will help make propulsion progress.

To achieve the challenging objectives of the present and the future, G.E. applies its knowledge and experience, and marshals R&D facilities among the most complete in the nation.

G.E.'s more than 100 research laboratories strive for new basic knowledge which can be applied to aerospace progress. For example, at the pioneering General Electric Research Laboratory, basic research is leading to advances in metallurgy, cryogenics, and other sciences vital to aerospace progress. These activities supplement the direct efforts of extensive aircraft gas turbine R&D facilities at Evendale, Ohio, and Lynn, Massachusetts.



## **NUCLEAR PROPULSION**

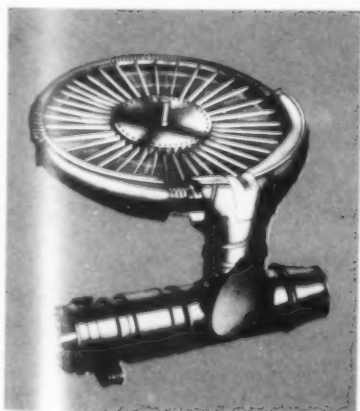
This special test assembly was designed and built by General Electric under contract. It consists of a nuclear reactor, shield, controls, and two modified J47 engines. General Electric first successfully operated a turbojet on nuclear power in 1956. Development progress is continuing.

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**J93** The General Electric Mach 3 J93 will power the North American B-70 Valkyrie to cruising altitudes above 70,000 feet and speeds of more than 2000 mph.



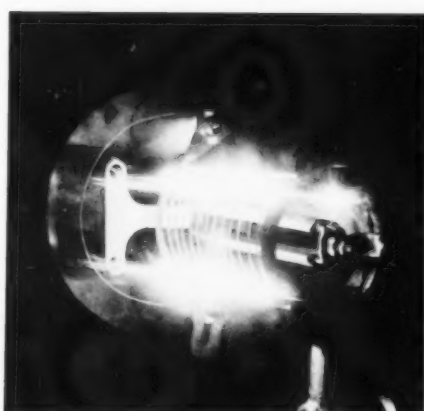
### **TOMORROW'S VTOL**

Currently under development, General Electric lift fan engines hold promise for a new generation of aircraft which can take off straight up, hover, and move forward at high speeds.



### **ROCKET POWER**

Development concepts at G.E. include plug nozzle engines (below) which are markedly smaller than conventional engines of the same thrust.



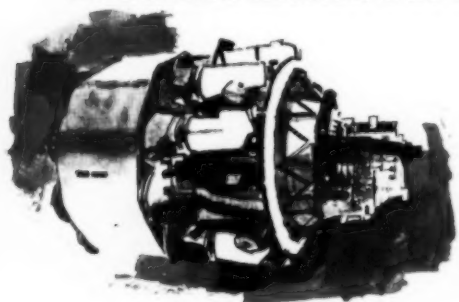
### **ION ENGINES**

In the void of space, a few ounces of thrust can control vehicle flight paths. One way to achieve this thrust: electrical propulsion. G.E. is investigating an ion engine which electrostatically accelerates mass, such as cesium ions, to produce thrust.

GENERAL  ELECTRIC

# Milestones

in General Electric's 27 million jet flight hours



In 1942, the first jet flight in America was General Electric powered. Twin I-A engines (above) powered the Bell P-59 at 450 mph.



The J47 powers Boeing B-47 Stratojet bombers, backbone of America's deterrent strength during the past decade.



North American's F-86 Sabre Jets, powered by General Electric J47's, scored a 14-1 victory ratio in Korea.



America's first Mach 2 engine, the J79, won accolades for performance and reliability. Vice President Nixon (center) presented the Collier Trophy to (left to right) USAF pilots Major Walter Irwin and Lt. Col. Howard Johnson, G.E.'s Gerhard Neumann and Neil Burgess, Lockheed's Clarence Johnson for F-104/J79 design and flight.

(196-38)

## GENERAL ELECTRIC ENGINES POWERING THESE AIRCRAFT HAVE FLOWN MORE THAN 27 MILLION JET FLIGHT HOURS

BELL XP-59A  
BELL XP-83  
BOEING B-47  
BOEING KB-50  
CHANCE Vought REGULUS II  
CHASE XC-123A  
CONVAIR B-36  
CONVAIR B-58  
CONVAIR 880  
CONVAIR XB-46

CONVAIR XP-81  
DOUGLAS RB-66A  
DOUGLAS XA-26F  
DOUGLAS XB-43A  
DOUGLAS XB-53  
DOUGLAS XF4D  
DOUGLAS D-558  
GRUMMAN F11F-1F  
KAMAN HU2K

LOCKHEED P-80  
LOCKHEED F-104  
MARTIN XB-48  
MARTIN XB-51  
McDONNELL F4H-1  
McDONNELL GAM-72  
NORTH AMERICAN B-45  
NORTH AMERICAN F-86  
NORTH AMERICAN F-86D

NORTH AMERICAN F-86H  
NORTH AMERICAN XFJ-1  
NORTH AMERICAN FJ-2  
NORTH AMERICAN A3J-1  
NORTH AMERICAN XT-39  
NORTHROP N-156 F  
NORTHROP T-38  
NORTHROP XF-89  
NORTHROP YB-49

REPUBLIC XP-84  
REPUBLIC XF-84J  
REPUBLIC XF-91  
RYAN FR-1  
RYAN XF2R-1  
SIKORSKY HSS-1F  
SIKORSKY HSS-2  
SIKORSKY S-62  
VERTOL H-21D  
VERTOL YHC-1A

FLIGHT PROPULSION DIVISION

**GENERAL  ELECTRIC**

CINCINNATI, OHIO AND LYNN, MASSACHUSETTS

# Aviation's Amazing Mr. Jeppesen: Chartmaker Extraordinary

*Ex-United pilot creates \$2.5 million-a-year  
business with ten cent notebook and \$450 loan.*



Jeppesen

**I**N 1929, CAPT. E. B. Jeppesen was flying the Salt Lake-Reno night mail for Boeing Air Transport when he decided that this business of getting around through the air without knowing exactly how high this mountain was, or where that powerline might be, was strictly for the birds.

So, with a 10-cent notebook he started his own "flight manual." Today his name rates among those who helped change airline flying from a seat-of-the-pants operation to its present highly technical status.

"Jepp's" name is known by a vast majority of pilots in the U.S., and many overseas—airlines, general aviation, military, private. They use the flight manuals, computers, plotters and other aids supplied by Jeppesen & Co., Denver. In a Jeppo manual are charts for avigation, terminal areas, approach procedures, airports, plus data on radio, traffic control, meteorology and a number of other subjects.

Jeppo now has 25 million manual pages in circulation—many of which must be constantly revised for subscribers. Yearly sales total \$2.5 million for all products. More than 97% of U.S. airlines, a number of international carriers, 85% of business and executive pilots, plus branches of the military use the Airways Manual and the other products. The company has 155 employees and a branch in Frankfurt, Germany.

Flashing back to 1929, Jepp, with notebook and pencil,

climbed the mountains, taking a couple of altimeters with him, and jotted down the heights. With pick and shovel he dug around the base of a smokestack at Laramie until he found the plate on which the height was recorded. Into the book went rough drawings of airports, information on runway lengths, obstructions, etc. Although the government constructed some navigational aids, it didn't establish approach procedures, so he worked out his own by actually flying the patterns.

Word got around in the pilot fraternity, and others wanted copies of Jepp's notes. He ran them off on a mimeograph in the basement of his Cheyenne home. Demand soon exceeded capacity of his hand-operated plant, so he had 50 manuals printed and sold them at \$10 each. This was in 1934—the real start of what is now Jeppesen & Co. Capital amounted to \$450, borrowed from a bank.

Company headquarters continued in Jepp's basement. He hired some help, continued to fly for United and worked on manuals during his offtime. For years he personally proofread every chart. His wife, Nadine, a former UAL Stewardess—who had climbed the mountains and dug around the smokestacks with him—kept books, handled billings, etc. Jepp's employees tramped through her house at all hours, and twice the FBI investigated reports that "strange things" were going on in the basement. Finally, in 1941 "she



Photo-News Service

Weekly staff meeting at Jeppo. Left to right: Harald H. Prommel, manager, map sales dept.; Kenneth H. Skinner, v.p. military sales; Edmund H. Moerer, office manager; John R. Dickinson, assistant to the president; E. B. Jeppesen, president; Helen Jacobs, administrative assistant; Wayne A. Rosenkrans, v.p. production; Nadine A. Jeppesen, secretary-treasurer; Wm. A. Prescott, manager, general aviation sales and service; Robert B. Oslund, production manager; and Chas. W. Gillespie, manager, air carrier sales, service.

kicked me out of the basement," Jepp relates, and the company moved into a small office in Cheyenne, later transferring to Salt Lake, then to Denver (Jepp took early retirement from UAL in 1953 to devote full time to the business). Last year it occupied its own 45,000-sq. ft. building just north of Stapleton Field.

A number of "firsts" are claimed by Jeppo—first (1) in making approach charts, not only cartography, but in going out and flying to establish a definite procedure, (2) in making aviation and route charts, (3) in designing instrument approach techniques. Jeppo says it is the only independent worldwide company using consistent charts and service regardless of where a pilot goes. "Procedures for Buenos Aires are presented in the same format as those for Chicago," says Jepp.

Biggest income producers, in order, are general aviation sales, air carrier, military and maps.

### Streamlined operation

Here's an example of what's involved in changing a manual page. Jack Davis, who heads the Washington office, gets a new directive from FAA. He puts it on the teletype, and in a matter of minutes things start to happen in Denver. A battery of IBM machines tells the production department the extent of distribution the change will require. The editorial department analyzes the information for authenticity by checking against a library of all known source material. After editing and more checking, the revised chart goes to the photo lab, plates are made and sent to one of several presses in the plant. Next is punching, trimming, collating and mailing. Postage bill tops \$200,000 a year.

In an average week, 21,000 drafting changes go through the plant. Cut-off day is Tuesday and revisions are in the mail on Thursday. In case of special requirements, changes can be made in 24 hours.

When FAA and Air Transport Association finally got matters ironed out with the Air Force so that commercial jets could operate at altitudes above 24,000 ft.—formerly exclusively military—Jeppesen charts were available in short order. Current program calls for only 15 days notice of a new high-altitude jet route prior to getting the charts in the cockpits.

The Frankfurt office, headed by Capt. Thomas W. McKnight, USN (Ret.), duplicates the Denver operation on a smaller scale—and has some additional problems. It produces manuals in English, the standard worldwide aviation language, but information is received in many languages and must be translated. All Frankfurt charts are in knots and metric values. While Europe is now gearing for the jet age, operations are still on a country-to-country basis, so—different charts for each nation.

Two new offices will be established this year, one in South America—location not yet decided—and one to serve Asia and the Far East, probably in Tokyo.

Jeppo's \$2.5 million sales come not only from manuals but from a variety of products. It produces a full-color relief wall map on an orthographic plane—looking straight down. A number of airlines provide Jeppo route maps for passengers. The company is the official source of maps supplied by various state aviation commissions. Jeppo maps are found in many textbooks and are made for specific educational levels, from lower grades through college.

Lots of time and research go into these maps. A skilled artist, faced with the job of getting mountains, rivers and highways shaded exactly right, does well if he completes one square inch per hour. Original artwork on the map of California took 1,500 man-hours.

Some Jeppo computers are scaled to Mach 3.5 and when planes get even faster the company plans to have appropriate computers ready, plus plotters and charts, and will sell

flight cases to hold all the equipment. These cases are one of its newest products.

Soon to be announced is its latest J-AID (Jeppesen Airport and Information Directory), aimed at the private or non-professional pilot.

Jeppo now operates its own Beech Travel Air, used primarily by its general aviation staff in their sales travels.

Included in the Jeppo organization are 25 pilots, plus navigators, traffic controllers and other qualified people who have the necessary authority to get their jobs done. Assistant to the president John R. Dickinson holds both Army and Navy pilot ratings. O. R. Maxson, 17-year employee, is research and development manager and is now on loan to the Frankfurt office. Jack Davis, in Washington, was a USAF pilot and served as supervisor of operations specifications for Northwest Airlines before joining Jeppo. Tom McKnight, Frankfurt manager, had 21 years of Navy experience and retired with 4,600 flying hours.

Wayne Rosenkrans, 15-year veteran, was a wartime fighter pilot and is also qualified in multi-engine equipment. K. H. Skinner, v.p.-military sales, was Western Air Lines' director of regulations and organizational control before joining Jeppo. Charles W. Gillespie, manager of air carrier sales and services, was a traffic controller. William A. Prescott, general aviation sales manager, holds commercial and transport ratings. Harold Prommel, manager of map sales, is a celestial navigation instructor, flight instructor and commercial pilot.

Last, and far from least, is the former stewardess, Nadine A. Jeppesen, secretary-treasurer.

Incidentally, as a reminder that the company had small beginnings, Jepp insists that the following entry always be carried on the balance sheet: "Original investment: \$450."

## Pilot Strike Aid Tops \$2.5 Million

Air Line Pilots Association is now studying a more equitable means of levying assessments and paying benefits to pilots during work stoppages. As part of its study of past payments, an ALPA committee came up with this tabulation of sums paid during airline strikes since 1946:

Airline	Year	Duration	Benefits Paid
TWA	1946	26 days	\$298,631.24
AOA	1947	20	20,292.52
NAL	1948	295	508,044.33
UAL	1951	10	29,996.97
AA	1954	25	306,211.55
NAL	1956	Variable*	14,609.00
NAL	1957	60	74,190.92
WAL	1958	100	431,855.07
CAP	1958	39	189,548.38
TWA	1958	15	**
EAL	1958	32	742,139.93
AA	1958-59	22	10,418.13

\$2,625,938.04

Notes: \*Affected various pilots varying periods of time.

\*\*TWA pilots requested ALPA action on benefits but then withdrew request.

Until the 1958 strike of Eastern mechanics and engineers, the 1948 National pilot's strike topped the list for benefit payments at \$508,044. Although of considerably shorter duration (32 against 295 days) EAL stoppage resulted in \$742,139 in pilot benefits. Amounts paid in 1958 totaled \$1.37 million or 52% of the total for the 11 years.

Ironically, the most costly strike did not involve a pilot walkout, whereas the most recent lengthy pilot walkout (22 days at AA) netted the lowest in benefits (only \$10,000).





1. 8:31:14—Rolling up to gate at Lockheed Air Terminal.

## PSA's Quick-Stop Electra, In and Out in 8 Minutes

One of the truly rare examples of a small airline that has gone "all turbine" virtually overnight and is making a big success of it is Pacific Southwest Airlines, California intra-state carrier (*AIRLIFT*, Dec.).

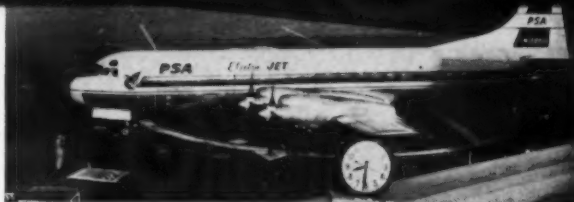
A key factor in this success is "on time" operation, often running as high as 99.2%. Streamlined ramp operations; service without frills.

Last year PSA parlayed this combination into a \$3.5 million business, netted \$260,000 after taxes. This year, with its three Lockheed Electras, president K. G. Friedkin looks to a 5% to 10% increase in both.

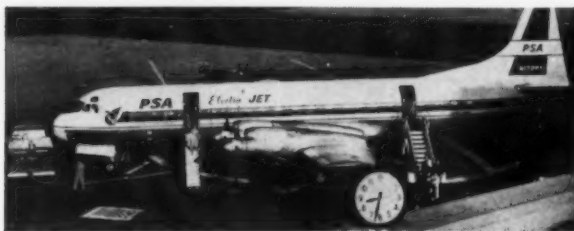
To show how it's done, *AIRLIFT* here presents an exclusive photo sequence, complete with clock, of a typical PSA flight in and out of Lockheed Air Terminal, Burbank, enroute from San Francisco to San Diego.



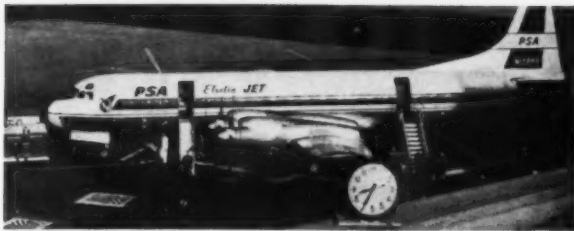
9. 8:39:03—PSA on its way, ramp time 7 mins. 49 secs.



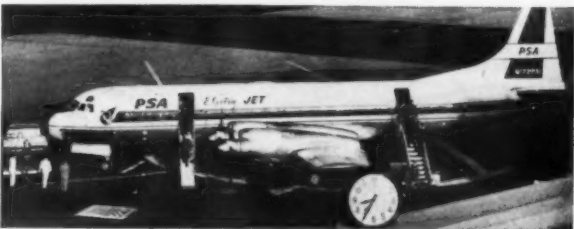
2. 8:31:19—In position, agent signals "cut engines."



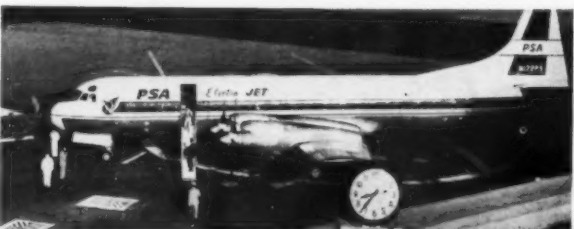
3. 8:32:13—Passengers deplane from front and rear.



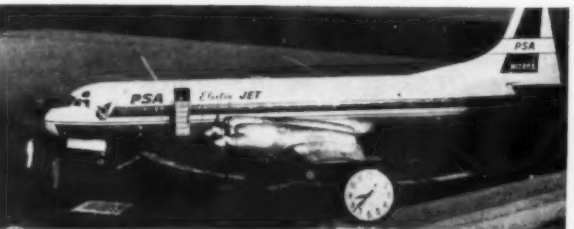
4. 8:34:42—Reloading begins within 2.5 minutes.



5. 8:35:07—Last passengers board, ground crew set.



6. 8:36:43—Aft ramp removed, pilot reboards plane.



7. 8:37:36—Front stair raised, all clear on ground.

8. 8:38:58—All engines started, cleared to taxi.



# Hidden Profits in Jet Maintenance

By H. J. HEINRICH

## What PPC Is All About

*Production Planning and Control is one of the newer phrases in the airline vocabulary.*

*Taken from the manufacturing side of industry, PPC is now being applied to airline maintenance, but so recently that there is still some question as to what it is and what it is trying to achieve.*

*Briefly, PPC is the planning which precedes the actual maintenance and overhaul work of an airline, plus the follow-up during and after execution of the work.*

*To understand its importance, one must realize that the airlines' resources have been severely strained by the heavy capital and operational demands of the jets, and that all departments are under constant pressure for greater efficiency and economy—for new ways of getting the most out of equipment, facilities and manpower. In this search the maintenance and overhaul function has come under close scrutiny because it is such a large contributor to the overall running cost of the airline that it offers correspondingly large potential economies. This is where PPC enters the picture.*

*Production planning can give the airlines a lead toward greater maintenance and overhaul efficiency. In IATA we think that it is already doing so. We have set up a group to study this subject, which is now developing guidance material on good planning concept and techniques. Here, Mr. Heinrich, who is Chairman of the IATA Production Planning and Control Group and superintendent of planning, Trans Canada Air Lines, raises some basic questions which face the airline planner today.—S. Krzyżkowski, Technical Director, IATA.*

**W**LET'S NOT GET overly concerned about the jets. Sure, they are big and they'll give us lots of trouble, but we'll learn to handle them just like we did their piston predecessors."

This theme echoes today in many quarters of the airline industry. If it helps allay the fears of the technicians, all well and good. But if it also lures planners into the trap of running jets on piston age philosophy, watch out! The airline may pass up substantial profits; and it may even be hard pressed to keep its head above water.

The big jets, capable of net earnings of \$1,500 per flight hour, a figure unheard of in piston days, calls for a reappraisal of some long cherished rules of the game.

If a jet with 7 hours' daily utilization can earn \$4 million annually at 70% load factor, what prevents the airline from achieving 12 hours and paying off its purchase price in less than a year of operation? What limitations are imposed by fares, weather, schedules, maintenance and what would it take to adjust those limits to their optimum?

Let us consider maintenance alone. As the largest department in the airline, responsible for some 30% of annual operating costs and a very heavy share of total capital investment, it will profoundly influence company profits.

In piston days we became accustomed to regarding main-

tenance as the largest spender in the airline. The jets promise to perpetuate that unenviable role. This, however, is only half of the story. The philosophy adopted for jet aircraft maintenance can significantly affect operating revenues.

A better-than-average piston-era check system requires a five-day ground tieup for each aircraft approximately every 3,000 flight hours, or once a year. This is supplemented by progressive checks every 200 flight hours, lasting up to one full day.

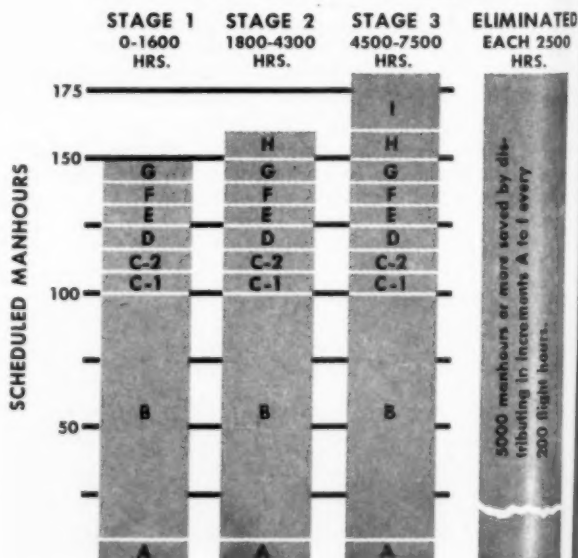
Applied to the jets, this system presents the airline with the alternatives of buying an additional aircraft to be used as a maintenance spare, or of curtailing operating schedules to fit maintenance tie-up requirements. This implies a minimum of \$1 million annually in ownership cost alone.

Furthermore, every day the jet is hangared, be it for modifications or general maintenance, when it could have been used for revenue service, the airline pours \$25,000 in potential revenues down the drain.

Clearly, this well-tried concept of piston days imposes economic penalties of such magnitude as to suggest a grass

*Continued on Page 53*

## Continuous Maintenance Concept



A- 50 hr. items B- 200 hr. items C1- 400 hr. items  
C2- 600 hr. items D- 800 hr. items E- 1200 hr. items  
F- 2400 hr. items G- 2500 hr. items H- 5000 hr. items  
I- 7500 hr. items.

Stage 1 check is accomplished every 200 hrs. from zero to 1600 hours flight time. It includes work normally assigned at 2500 overhaul visit. Stage 2 check, also at 200 hr intervals picks up usual 5,000 hr. items. Stage 3 similarly picks up 7500 hr. work.



# A MAJOR BREAKTHROUGH

- Push button navigation between any two points regardless of the location of ground stations
- Left/Right indication of track with distance to go
- Distortionless pictorial presentation
- Auto-pilot coupling

After years of persistent research we now announce this major breakthrough in electronic technology. Resulting from a revolutionary mathematical approach we have developed the Omnitrac computer—light, compact and reliable, Omnitrac converts hyperbolic or other position lines into rectilinear co-ordinates.

Based on a "master" map of the world, Omnitrac correlates navigational data of no matter what nature—Hyperbolic, Doppler, Inertial, Rho-Theta or Dead Reckoning—for a single undistorted pictorial display with automatic chart change.

Omnitrac provides *all* the facilities and advantages of high accuracy hyperbolic systems *plus* push button navigation with left/right meter presentation and distance to go between any two points regardless of ground station location. This amounts to having an infinite number of point source beacons situated

exactly where they are required for any journey, with either meter or pictorial presentation or both.

Omnitrac, by reducing all data to rectilinear co-ordinates related to a master grid, provides guidance information for the auto pilot.

Omnitrac, developed by The Decca Navigator Company, the only company in the world specialising in navigation systems, provides *all* the facilities required for jet age navigation.

## **DECCA**

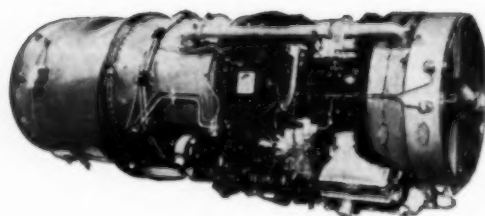
THE DECCA NAVIGATOR COMPANY LIMITED LONDON ENGLAND

APRIL, 1960

# ROLLS-ROYCE BY-PASS JETS

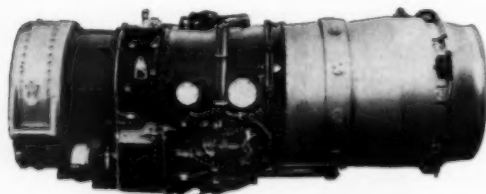


*designed for maximum operating economy*



Conway by-pass jets will enter service this year in Boeing 707-420 and Douglas DC.8 jet airliners at 17,500 lb. guaranteed minimum thrust. The Civil Conway is being developed to powers over 20,000 lb. thrust with improved fuel consumption and will power the Vickers VC.10.

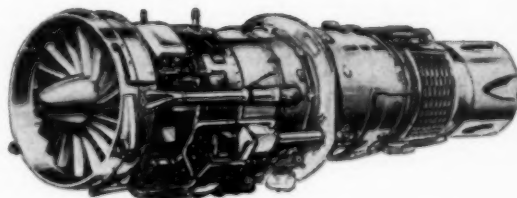
THE BY-PASS PRINCIPLE  
PROVED BY THE CONWAY IS  
NOW GENERALLY ACCEPTED  
AS THE CORRECT FORMULA  
FOR JET TRANSPORTS



The RB. 141 of 14,300 lb. thrust will power later versions of the Sud Aviation Caravelle.

ROLLS-ROYCE OF CANADA LIMITED, Box No. 1400, ST. LAURENT, MONTREAL 9 P.Q., CANADA

ROLLS-ROYCE LIMITED, DERBY, ENGLAND



The RB. 163 of 10,100 lb. thrust has been chosen to power the Airco DH.121.

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roots look at maintenance philosophy for jets.

One approach now being introduced by an international carrier which will tend to optimize jet fleet earnings is to accomplish all maintenance and overhaul during regularly scheduled layovers in work packages of 9 hours elapsed hangar time every 200 flight hours. This "Continuous Maintenance" system eliminates big checks which would otherwise necessitate special tie-ups of the aircraft. It reduces the fleet size by eliminating the need for standby aircraft and concurrently provides flexibility to achieve maximum utilization in line with traffic demands.

An equally strong case for innovation and objectivity can be made in a number of other areas of jet maintenance. Apply these few examples:

#### Aircraft Utilization

What is the upper limit on aircraft utilization and what are the incremental additional costs of going from minimum to maximum? Conversely, what is the low limit which must be achieved at least to break even? Remember that at 8 hours' daily utilization, the \$6 million jet is working at barely 1/3 capacity.

#### Overhead

What is true overhead cost today and how does it vary with changes in fleet size and utilization? What is the most equitable way of allocating overhead to different fleets maintained by a common facility and manpower pool?

The piston era established a universally accepted rule of thumb to assess overhead, at 100% of direct costs. It is extremely doubtful that this rate is anywhere near realistic for jets. Some recent studies suggest a figure closer to 50%, with obvious major implications on profit margins.

#### Inventory

Another maxim of piston days is minimum inventory. Per se, it is an admirable objective to keep investment low and reduce holding costs. But, can one afford to apply this philosophy to the jets? If a plane-load of passengers is passed over to the competition for lack of a part that keeps an aircraft on the ground, the cost is a revenue loss of \$35,000 on a one-way trans-Atlantic flight. It will only

take three such incidents a year to pay for a 10% increase in what is now considered an acceptable level of inventory to support a fleet of 10 big jets.

#### Plant Capacity

What fleet size and utilization can a maintenance base support today? How would this capacity change with a switch to the "Continuous Maintenance" philosophy? Can the available capacity be used by maintaining somebody else's aircraft? What price will yield a profit and still be competitive?

The size and complexity of big jet aircraft legislates a minimum plant size and versatility which will leave many maintenance bases vastly under-utilized. The resultant burden rate can therefore become prohibitive unless diversification or other remedial steps are taken.

Questions such as these weigh heavily in the minds of maintenance planners throughout the industry. It is a testimonial to inter-airline cooperation that these and many other problems are being tackled today on a worldwide basis. Under the auspices of IATA, the production planning and control group is currently inquiring into such areas as jet maintenance concepts, material provisioning, maintenance performance measurement, inter-airline comparisons and others. It will report its findings and conclusions in a planning handbook to be published after its ratification at the group's spring meeting.

Close liaison is being maintained with a similar committee, comprised exclusively of North American carriers, operating within the framework of ATA.

The introduction of jet aircraft unquestionably represents a major technical breakthrough in aviation. Of even greater significance, however, are the commercial possibilities the jet offers for economic penetration of hitherto untapped markets. The jet may well prove to be an important instrument for the emancipation of underprivileged countries across the globe, thus furthering the cause of world peace and stability.

It will take a healthy airline industry and progressive management philosophies to accomplish the job. The stakes are high, but so are the rewards. Let jet planners, therefore, match the ingenuity of jet designers!



Photo Courtesy The Aeroplans

Members of the IATA Production Planning and Control Group at their first meeting in London. The Chairman, H. J. Heinrich of TCA, is seated at center, flanked by Stanislaw Krzeczowski, right, IATA Technical Director, and R. Boyd Fergus, Secretary of the Group.

Others seated are, on the left, G. H. H. Giltrap, Aer Lingus, and I. J. Gregory, BEA; and on the right, K. J. B. Dunn,

BEA, and W. G. Dorkings, BOAC.

Standing, from left to right: A. J. Docker and R. H. Anderson, BEA, F. Donovan, Aer Lingus, K. Zimet, El Al, S.A.C. Baker, BOAC, P. Selrod, SAS, T. B. Phillips, South African, P. W. D. Vine, WAAC-Nigeria, R. M. Houze, SABENA, H. Bakz, KLM, A. Moid, Pakistan, A. Lundin, Finnair, R. Freitas, TAP, H. Hiraoka, JAL, and R. J. McWilliams, CPAL.



**PRATT & WHITNEY AIRCRAFT APPROVED IT...**



**DOUGLAS AIRCRAFT APPROVED IT...**

**UNITED AIR LINES DC-8 JETS NOW FLY WITH IT**



## Texaco Synthetic Aircraft Turbine Oil

Another leading airline—United—has swung into domestic jet service. And Texaco Synthetic Aircraft Turbine Oil 15 is being used to lubricate the Pratt & Whitney Aircraft JT-3 and JT-4 engines on United's new DC-8 Jets.

Why Texaco? First, because every lubricant characteristic essential to jet service is found in Texaco Synthetic Aircraft Turbine Oil 15. Second, because Texaco refining skill and packaging and handling care assure that the SATO 15 is wholly uncontaminated and free from foreign matter. Third, because Texaco quality and aviation engineering service have kept Texaco overwhelmingly first choice in aircraft lubrication for the past quarter century.

Texaco Inc., Aviation Sales Department, 135 East 42nd Street, New York 17, N. Y.

Texaco Synthetic Aircraft Turbine Oil 15 has been approved for: Pratt and Whitney Aircraft JT-3 and JT-4 engines used in Boeing 707s, 720s and Douglas DC-8s.

**TUNE IN:** Texaco Huntley-Brinkley Report, Mon. Through Fri.-NBC-TV



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LUBRICANTS  
AND FUELS

**FOR PURE JET, TURBO-PROP AND PISTON-ENGINE AIRCRAFT**

**AIRLIFT**



# Equities Skid to All Time Lows

By SELIG ALTSCHUL

**Year long decline in face of booming market has dropped market/book value ratios to new low levels. Here's why.**

Airline equities are being offered in the market place at relative all-time lows. Sinking price quotations for airline securities have been evident during recent months. The erosion of values, however, is even more startling when current market quotations are compared with book values. Ironically, while this deterioration has been taking place, actual book values of the airlines have been bolstered.

This phenomenon recognizes that earning power—past, present and future—ultimately determines market levels for airline securities. And this same market level dictates the price to be paid by the airlines as they require additional equity capital to pursue expansion programs.

Further, the attraction of equity or equity-type capital is vital to many carriers if they are to support substantial loans incurred as part of their financing programs.

Hence, the market level of airline securities in relationship to book values remains crucial at all times.

No stockholder likes to see his equity diluted. As long as varying degrees of equity financing may be required it is essential that a market premium over book value be established over a continuing period of time. It is not enough that a slight market premium over book occur during the abnormal boom markets which existed recently in industrial securities.

It is the normal experience developed over a period of years that generally controls any financing.

Airline equities have been in a market decline for about a year—this in the face of one of the most booming stock markets in history.

As a consequence, prevailing market/book value ratios (Table No. I) have for the most part, declined to all-time lows. Historically, even after heavy losses, the group has been able to command far better investment evaluations. This is indicated in Table No. II where recent market experience of equities of nine major trunk airlines are evaluated.

The industry lost \$5.6 million in 1946, \$20.2 million in 1947 and \$5 million in 1948, yet throughout that period, airline equities predominantly sold at wide premiums over their book valuations. In 1959, the industry earned about \$52 million and, as can be seen, deep discounts to book values are currently present in their market prices.

Underlying book valuations normally can be considered as a floor to protect market valuations in a regulated industry. The theory, of course, is that the industry is entitled to a statutory return on its investment. The industry is currently pressing for an average 12% rate of return on the investment in the pending General Passenger Fare Investigation. Examiner Wiser's report recommended a rate of return of 10.25% for the "Big Four" and 11.25% for other domestic trunks.

Even if the lower rates of return were in effect and sustained consistently, market valuations of equities would not pierce the floor of their book valuations and, in fact, would rise to varying premiums.

Obviously, serious doubts are now being cast as to the earning power abilities of the airlines. Hence, any determination by CAB as to what is a proper rate of return may prove nothing more than a hunting license in a jungle of over-competitive routes. In other words, there is no guarantee that any airline will achieve the rate of return stipulated.

Railroads, too are permitted by the Interstate Commerce Commission to earn certain statutory rates of return on the investment, but few do. In this instance, competitive forms of transportation have diverted substantial sources

**Table I Net Worth and Market Valuations Major U. S. Airlines**  
(Per Common Share)

	Book Value		Market Price	Ratio	Common Shares (F)
	Dec. 31, 1948	Dec. 31, 1959	March 11, 1960	Market To Book	
American .....	\$ 2.67	\$19.87(E)	\$20.00	101%	8,621,218*
Braniff .....	7.42	12.50	10.25	82	2,948,119
Capital .....	0.34	12.47(A)	10.375	83	909,659
Continental .....	7.00	9.16(E)	6.50	71	1,832,061
Delta .....	10.74(B)	33.66	21.00	62	1,122,225
Eastern .....	10.61	38.76	25.50	66	3,170,776
National .....	6.20(B)	18.86	14.00	74	1,745,015
Northeast .....	2.26	0.27(C)	5.00	1852	1,783,688
Northwest .....	13.41	28.74	22.625	79	1,818,781*
Pan American .....	14.41	21.56(E)	17.00	79	6,677,000
TWA .....	3.06	17.84(C)	13.875	78	6,674,155
United .....	16.91	35.03	27.75	79	3,946,070
Western .....	8.19	23.18	26.75	115	1,137,669

\*Assuming complete conversions of preferred (A) As of November 30, 1959 (B) As of June 30, 1949 (C) As of September 30, 1959 (E) Estimated (F) Outstanding as of December 31, 1959.

**Table II Trend of Average Market/Book Value Ratios**  
For Major Domestic Trunk Airlines At Year End

	1946	1948	1949	1950	1952	1954	1956	1958
American .....	332%	316%	277%	252%	223%	169%	157%	186%
Braniff .....	330	134	99	122	135	95	101	128
Capital .....	371	...	343	171	113	120	186	140
Eastern .....	281	168	131	126	135	130	168	117
National .....	532	123	117	157	136	84	103	92
Northwest .....	204	98	68	80	83	62	73	148
TWA .....	299	1127	157	171	118	109	92	135
United .....	186	83	71	88	112	98	107	111
Western .....	380	95	73	97	101	87	107	177



of traffic away from the rails with consequent erosion of revenues. As a result, many railroads have, for some time now, failed to achieve the statutory rates of return established by the ICC and their equities sell at substantial discounts to book values.

The CAB, while strictly regulating rates and the rate of return to be achieved—conditions which govern in a more protective atmosphere, has removed protective features by creating excessive competition through the multiplicity of routes.

In examining current airline market valuations, it is interesting to note that only Western commands a respectable premium over its book value in the market place. (Northeast's high premium is abnormal and is without significance to current earnings relationships). The Western experience is a re-

flection of the sustained earnings generated in recent years.

The increase in book values for most carriers from 1946 through 1959 is also noteworthy. Re-investment of earnings is, of course primarily responsible for this development.

The steady increase in book valuations for the bulk of the airlines, on a per common share basis, reflects another manifestation of growth.

The industry growth in traffic and revenues, too, has been well publicized and anticipated. It is for this reason that back in 1946, investors and speculators alike were willing to bid airline prices up well beyond book values. But they fully expected that earnings would follow as well. The earnings are not present and this disillusionment accounts for the low valuations currently accorded airline equities.

### ON TIME BOXSCORE—DECEMBER, 1959

TRUNKS	Rank	On Time to 15 min. late	On Time to 5 min. late	On Time 6-15 min. late	16-30 min. late	Over 30 min. late	Total trips reported
American	6	68.6%	68.3%	53.7%	14.6%	11.9%	5,949
Braniff	4	76.3	72.5	55.0	17.5	10.5	1,357
Capitol	7	63.3	67.9	42.5	25.4	16.1	3,435
Continental	3	72.4	73.0	54.9	18.1	11.7	1,272
Delta	8	57.3	67.9	42.0	25.9	14.2	1,815
Eastern	5	69.8	70.4	51.0	19.4	13.1	5,486
National	12	55.8	52.1	32.0	20.1	18.6	1,168
Northeast	10	60.2	63.6	39.3	24.3	15.1	2,694
Northwest	1	83.8	82.4	71.2	11.2	5.6	1,411
TWA	9	68.4	65.7	45.2	20.5	14.5	3,220
United	2	77.8	75.0	55.6	19.4	12.0	3,690
Western	11	71.0	62.6	39.7	22.9	18.1	1,366
<b>TOTAL</b>		<b>68.5%</b>	<b>68.8%</b>	<b>49.1%</b>	<b>19.7%</b>	<b>13.4%</b>	<b>32,863</b>

#### BOEING 707 and DC-8

American	4	41.3%	43.2%	30.0%	13.2%	16.9%	39.9%	1,015
Continental	2	52.8	57.1	40.7	16.4	14.7	28.2	341
Delta	1	47.3	59.3	30.8	28.5	17.8	22.9	393
National	5	40.3	43.2	23.0	20.2	23.5	33.3	217
TWA	3	52.5	50.7	33.9	16.8	20.2	29.1	764
United	6	21.0	36.9	18.6	18.3	21.4	41.7	317
<b>TOTAL</b>		<b>45.3%</b>	<b>48.1%</b>	<b>30.6%</b>	<b>17.5%</b>	<b>18.6%</b>	<b>33.3%</b>	<b>3,047</b>

#### LOCKHEED ELECTRA

American	3	64.7%	68.5%	50.7%	17.8%	13.1%	18.4%	1,382
Braniff	4	56.9	53.9	35.2	18.7	14.1	32.0	262
Eastern	2	69.6	70.1	53.1	17.0	12.6	17.3	1,512
National	5	57.9	49.4	34.6	14.8	20.0	30.6	405
Northwest	1	70.4	77.5	60.0	17.5	8.3	14.2	303
Western	6	43.2	41.5	16.3	25.2	24.1	34.4	294
<b>TOTAL</b>		<b>64.3%</b>	<b>65.0%</b>	<b>47.2%</b>	<b>17.8%</b>	<b>14.1%</b>	<b>20.9%</b>	<b>4,158</b>

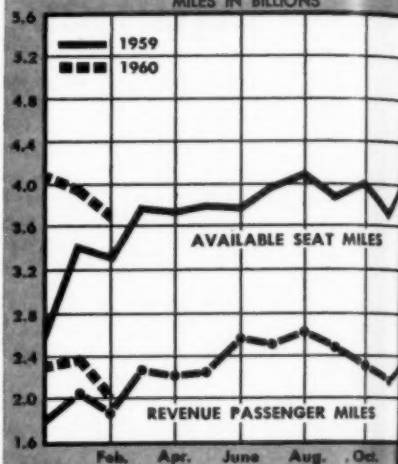
#### LOCAL SERVICE

Allegheny	3	81.9%	79.3%	53.7%	25.6%	10.0%	10.7%	289
Bonanza	8	79.9	68.6	51.3	17.3	10.0	21.4	440
Central	4	83.3	73.9	52.1	21.8	10.9	15.2	46
Frontier	10	67.4	59.6	35.4	24.2	19.4	21.0	277
Lake Central	6	66.1	71.4	40.9	30.5	15.6	13.0	269
Mohawk	12	47.4	46.1	26.3	19.8	23.9	30.0	1,184
North Central	5	78.3	72.7	53.2	19.5	11.9	15.4	1,435
Ozark	11	58.4	54.9	26.5	28.4	22.4	22.7	795
Pacific	13	58.6	45.8	19.6	26.2	18.9	35.3	275
Piedmont	2	89.1	91.1	82.9	8.2	2.4	6.5	123
Southern	9	63.7	67.8	42.0	25.8	17.7	14.5	503
Trans Texas	7	74.5	70.0	49.2	20.8	19.2	10.8	130
West Coast	1	82.4	92.9	88.5	4.4	2.1	5.0	341
<b>TOTAL</b>		<b>68.3%</b>	<b>64.3%</b>	<b>42.9%</b>	<b>21.4%</b>	<b>16.1%</b>	<b>19.6%</b>	<b>6,107</b>

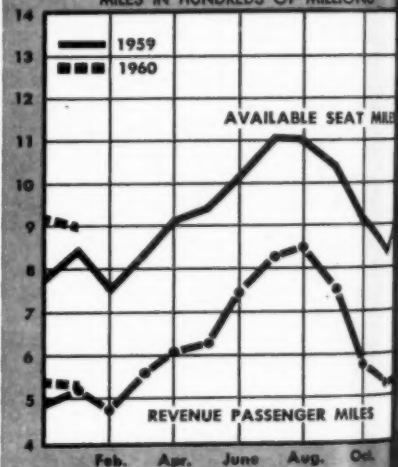
Statistics reflect nonstop and one-stop flights only. Data from airline reports to CAB.

## HOW'S TRAFFIC—Among U.S. Airlines

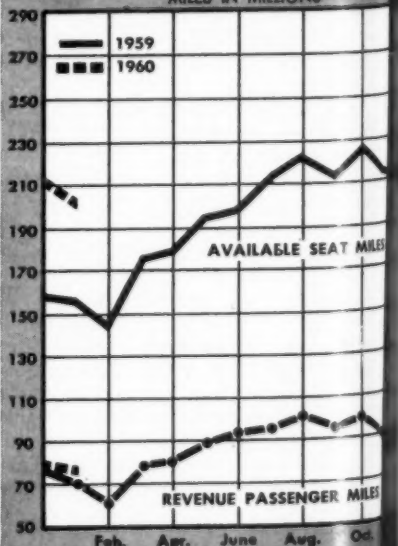
### DOMESTIC TRUNKS MILES IN BILLIONS



### INTERNATIONAL MILES IN HUNDREDS OF MILLIONS



### LOCAL SERVICE MILES IN MILLIONS





# U.S. Airline Traffic for January 1960 vs. 1959

This complete summary compiled by AIRLIFT Magazine from Official CAB Data.

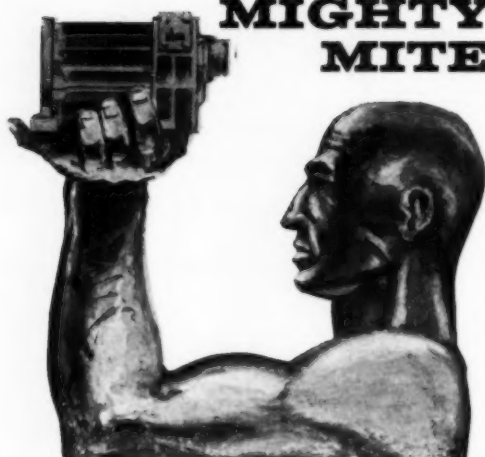
	Revenue Passengers (000)			Revenue Passenger Miles (000)			Total Ton-Miles Rev. Traffic			% Available Ton-Miles Used	
	1960	1959	% Change	1960	1959	% Change	1960	1959	% Change	1960	1959
<b>DOMESTIC</b>											
American*	455	349	87.7	508,492	231,816	119.3	60,043,782	28,402,296	109.9	57.9	51.8
Brant	175	193	-9.3	81,206	92,634	-12.3	8,816,413	10,318,719	-14.6	48.9	54.6
Capital	274	324	-15.4	118,590	141,498	-16.2	12,425,889	14,550,989	-14.6	47.0	52.1
Continental	112	79	41.8	78,058	46,225	68.9	8,078,572	4,743,859	70.3	42.7	52.1
Delta	248	251	-1.2	148,884	135,162	10.2	16,194,167	14,945,175	8.2	49.3	54.3
Eastern	498	512	-2.7	390,822	276,260	41.5	40,843,073	28,976,062	40.9	40.9	42.1
National	146	167	-12.4	103,836	117,375	-11.5	11,073,533	12,499,758	-11.4	46.0	48.8
Northeast	104	95	9.5	50,646	47,527	6.4	5,197,049	4,797,454	8.3	44.8	46.0
Northwest	159	139	14.4	125,301	110,281	13.6	14,319,534	12,586,433	13.8	50.3	46.5
Trans World	404	419	-3.6	368,085	370,460	-0.6	40,580,669	40,238,885	0.8	55.8	64.0
United	523	544	-3.9	352,187	427,777	-17.7	42,028,827	51,278,801	-22.0	54.5	60.8
Western	151	120	25.8	87,261	65,952	32.3	9,078,540	7,008,520	29.5	54.8	49.5
	3,669	3,212	14.2	2,413,388	2,062,967	17.0	268,680,048	230,566,951	16.5	50.9	53.5
<b>INTERNATIONAL</b>											
American	11	5	120.0	11,515	4,494	72.0	1,351,396	858,022	57.5	67.9	67.6
Brant	4	3	33.3	7,127	4,481	10.0	904,278	827,854	9.2	38.7	39.6
Caribair	32	27	18.5	2,273	1,911	18.9	248,075	208,980	18.7	61.0	69.7
Delta	3	4	-25.0	3,996	5,192	-23.0	486,455	635,300	-30.6	42.3	43.2
Eastern Overseas	35	27	29.6	52,784	39,904	32.3	5,599,055	4,314,832	29.8	62.7	57.6
San Juan	29	22	31.8	44,849	33,286	34.7	4,746,686	3,564,496	33.2	68.6	60.1
Bermuda	4	1	100.0	1,248	502	148.6	136,489	55,187	147.3	26.8	19.2
Mexico	4	4	...	6,887	6,116	9.3	715,880	695,149	3.0	47.9	54.9
National	5	7	-28.6	3,720	5,226	-28.8	409,161	589,843	-30.4	47.9	41.0
Northwest	15	11	36.4	24,744	23,807	3.9	4,585,525	4,471,497	2.4	47.8	40.6
Hawaiian	3	3	...	7,501	6,867	9.2	802,995	752,772	6.7	54.7	69.8
Panagra	10	10	...	15,267	13,748	10.9	2,217,508	1,971,250	12.5	40.3	56.0
Pan American System	232	211	10.0	365,874	322,893	13.3	49,716,490	44,317,365	12.2	58.5	62.8
Latin American	117	111	5.4	138,125	126,323	9.3	18,156,363	16,852,600	7.7	64.3	68.1
Atlantic	82	74	10.8	121,052	103,580	16.9	17,043,232	14,499,972	17.5	54.6	56.4
Pacific	29	23	26.1	102,760	90,324	13.0	13,955,446	12,535,683	11.3	57.9	65.9
PDX/SEA-HON.	4	2	100.0	11,600	4,518	78.0	1,263,680	715,921	76.5	61.9	59.5
Alaska	4	3	33.3	3,937	2,446	47.7	561,449	429,110	30.8	41.1	42.1
Trans Caribbean	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Trans World	15	22	-31.8	46,683	70,157	-34.2	6,963,735	10,113,795	-31.1	49.3	64.4
United	6	8	-25.0	14,960	18,450	-18.9	1,729,999	2,083,520	-17.0	61.8	54.7
Western	6	5	20.0	8,583	8,110	5.8	923,759	890,693	3.7	81.6	72.2
	374	313	19.5	557,526	521,484	6.9	75,135,436	71,073,991	5.7	56.9	61.5
<b>LOCAL SERVICE</b>											
Allegheny	34	33	3.0	4,129	5,746	-27.9	647,951	596,571	8.6	38.7	43.6
Bonanza	20	16	25.0	5,009	3,866	29.4	498,831	385,332	29.5	41.1	47.1
Central	12	12	...	2,414	2,472	-2.3	247,613	270,275	-8.4	32.9	34.7
Frontier	25	19	31.6	4,636	5,068	-9.3	730,516	565,443	29.2	40.0	52.8
Lake Central	17	15	13.3	2,590	2,513	3.1	271,286	257,487	5.4	39.4	44.2
Mohawk	42	42	...	8,283	8,343	-0.7	838,898	831,253	0.9	40.6	40.6
North Central	71	58	22.4	12,536	9,902	26.4	1,326,181	1,009,459	31.4	41.9	47.5
Ozark	36	33	9.1	6,344	6,154	3.1	667,876	632,810	5.5	41.6	50.6
Pacific	37	31	19.4	8,440	6,811	23.9	829,197	672,702	23.3	41.9	46.2
Piedmont	31	34	-8.8	6,748	7,470	-9.7	683,568	753,081	-9.2	40.7	43.4
Southern	21	20	5.0	3,893	3,565	9.2	410,019	374,309	9.5	35.4	37.7
Trans-Texas	22	21	4.8	5,363	5,080	5.4	575,454	541,034	4.4	38.1	43.6
West Coast	30	23	30.4	7,282	4,437	64.1	725,274	436,823	66.0	42.0	44.3
	398	357	11.5	81,667	71,627	14.0	8,452,664	7,326,581	15.4	39.9	46.4
<b>HELICOPTERS</b>											
Chicago	19	9	111.1	330	165	100.0	32,589	16,711	95.0	44.0	30.2
Los Angeles	3	2	50.0	102	75	36.0	16,496	12,765	29.2	60.4	52.2
New York	10	7	42.9	199	142	40.1	22,390	16,452	36.1	48.0	42.9
	32	18	77.8	631	382	65.2	71,475	45,928	55.6	48.3	38.9
<b>INTRA HAWAII</b>											
Alaska	27	13	107.7	4,276	1,726	147.7	310,134	145,261	113.5	51.7	52.5
Hawaiian Scheduled	39	32	21.9	5,961	4,754	25.4	607,265	491,400	23.6	57.4	57.0
	66	45	46.7	10,237	6,480	58.0	917,399	636,661	44.1	55.3	58.8
<b>ALASKA</b>											
Alaska	9	5	80.0	9,248	3,072	201.0	1,271,132	578,618	119.7	60.6	39.8
Alaska Coastal	3	2	50.0	297	219	35.4	37,697	28,353	33.0	62.0	46.5
Cordova	1	1	...	212	138	53.6	54,688	45,952	17.1	37.1	47.8
Ellis	4	3	33.3	229	159	44.0	26,514	19,338	37.1	61.4	67.9
Nor. Consolidated	1	1	...	358	431	-16.9	102,824	109,325	-5.9	55.1	56.0
Pacific Northern	7	7	...	6,289	4,662	34.9	999,253	1,011,350	-1.2	45.4	52.2
Reeve	1	1	...	896	574	56.1	227,635	178,908	27.2	52.2	52.8
Wien	1	2	-50.0	392	570	-31.2	138,385	383,497	-63.9	38.8	57.0
	27	22	22.7	17,921	11,825	51.6	2,858,128	2,375,341	20.3	51.7	49.4
<b>ALL CARGO</b>											
(Ton miles in thousands)											
	Mail			Express			Freight			Total Scheduled	
	1960	1959	% Change	1960	1959	% Change	1960	1959	% Change	1960	1959
Astco		9,723	...		18,729	...		271,438	...	5,774,525	3,264,710
Flying Tiger	69,925	44,679	55.5	55,033	77,463	-28.9	6,757,693	6,807,199	-0.7	10,099,922	11,514,482
Riddle	16,460	6,432	155.9	30,347	24,099	25.9	1,830,508	2,286,294	-19.9	1,933,926	4,182,729
Stick			...			...			...	6,460,380	2,009,066
Aerowest			...			...	473,235	531,354	-10.9	558,250	544,654
Seaboard & Western	471,299	329,110	43.2			...	1,952,154	1,318,623	48.0	4,436,012	3,704,638
	557,684	389,944	43.0	85,380	120,281	-29.0	11,013,590	11,186,456	-1.5	29,463,015	25,242,479

\*American Airlines operations suspended Dec. 19, 1958 to Jan. 11, 1959 because of strike.  
N.A.—Not Available.

# PORTABLE LIFT POWER

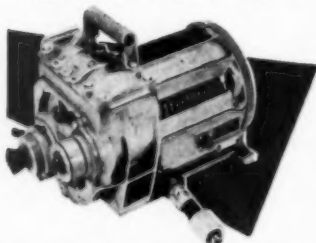
with . . .

## MIGHTY MITE



Strength comes in small packages, too! The 45-pound "Mighty-Mite" winch is as portable as your typewriter or bowling ball, but can lift 6,000 pounds. Yes, this amazing metal muscle can hoist the average automobile as easily as you pick up a pencil. "Mighty-Mite" is more than amazing . . . it's a versatile wonder, just the durable, dependable device you need to end heavy-weight lift-problems. When you think of lifting, think of "Mighty-Mite," a wonder winch.

**WEIGHS 45 LBS.**



**LIFTS 6000 LBS.**

A PRODUCT OF

# AAE

**ALL AMERICAN ENGINEERING COMPANY**  
CENTER ROAD AND LANCASTER AVENUE  
WILMINGTON, DELAWARE



## AIRLIFTS

• Who do you suppose is the major buyer of stereo records of railroad sounds? Aviation people, of course. And there are some good ones now available. One of the best is Railroad—A Farewell to Steam (High Fidelity Recordings, Inc., Hollywood, Calif.), taking the listener on the last steam passenger run on the Santa Fe out of Los Angeles. Three other excellent rail records are obtainable from O. Winston Link Railway Productions, 58 East 34th Street, New York 16, N.Y., and who do you suppose runs the office there when she isn't flying? An Eastern Air Lines stewardess, of course. Among the best customers? Airline pilots.

• Confederate General Nathan Bedford Forrest almost got Delta Air Lines involved in another war. Delta ran a large newspaper ad showing the uni-



formed general standing in the lounge of a DC-8 and borrowed his famous expression, "Fustest with the mostest," to remind people it was first in the Chicago-Florida market with jets. Sharp-eyed readers quickly noted that Forrest was wearing his sword on the right side, and the airline received a flood of indignant protests that this just isn't done—it's like saluting with the left hand. Finally, Burke Dowling Adams, Delta's ad agency, headed off the conflict by explaining: "Gen. Forrest wanted his sword where he could get to it 'fustest' in the event of hand-to-hand combat—because Gen. Forrest was left-handed."

• A Western Air Lines stewardess, Beverly Nelson, overheard two women passengers talking during an Electra flight. "This airplane sounds different from the other jet we flew," said the first woman. Replied her companion: "Well, of course. This one is electric, you know."

• What-won't-they-think-of-next department: In the Miami International Airport terminal is a coin machine that takes your blood pressure.



## DOUGLAS SELECTS BENDIX BRAKES FOR THE DC-8

It is fitting that the luxurious Douglas DC-8, one of the world's most advanced jetliners, should be equipped with Bendix, world's most advanced brakes. For these brakes, products of the most experienced manufac-

turer, perfectly match exacting jetliner requirements for smooth, sure ground control from touchdown to ramp. Besides being preferred for civilian jets, "Brakes by Bendix" are first choice on the fastest military jets.

Bendix PRODUCTS DIVISION South Bend, IND.



# Swissair Streamlines Caravelle Handling

By ANTHONY VANDYK

GENEVA, SWITZERLAND—A turn-around time of only 25 minutes is quite feasible for the Caravelle, experience in Europe has shown. But to achieve this remarkably low ground time highly trained personnel are required.

For this reason Swissair, which introduces the Sud Aviation jet into scheduled service in mid-May, has completed one of the most detailed reports of its kind on Caravelle ground handling. In preparing its report Swissair has drawn heavily on the experience of its partner, SAS, from which it will lease its four Caravelles. SAS has been operating the French jet in scheduled service for almost a year (See *AIRLIFT*, Dec.).

One reason why the Caravelle is easy to turn round quickly is that it has the same number of passenger service and cargo doors as the big jets. Loading and unloading of passengers in the main (tourist) compartment is greatly facilitated by the integral stairway in the rear.

Swissair will use guide fences while passengers are disembarking and embarking in order to keep them clear of the low wings and to mark the outer restricted areas in order to prevent ramp staff and equipment from entering them during refueling. For this reason Swissair insists that guide fences be positioned at both wing tips.

While disembarking and embarking passengers is simple, the same does not apply to cargo. Loading and unloading of freight is difficult, particularly when the lower compartments are involved. Swissair advises that the greatest caution must be taken due to the risk of damage to the doors and interior fittings of the compartments. In the lower compartments fire detectors and compartment lights are located on the top side and can easily be damaged due to their location.

Although all the cargo departments are pressurized, the ventilation in the lower compartments is described by Swissair as "very poor". Moreover, these compartments cannot be heated nor are they provided with any fire extinguishing system. Since the lower

compartment doors move inward, it is extremely important that the nets that separate the load and the door be in proper position before the doors are closed.

Because of the small size of the lower compartment doors and the special attention needed in unloading and loading these compartments, SAS recommends the use of a loading platform to facilitate the work of cargo handlers. To prevent ground personnel from being injured and aircraft from being damaged Swissair has decided to re-

strict the weight of each piece of freight to 150 kilograms in the upper compartments and 50 kilograms in the lower compartments.

Live animals cannot be carried easily in the Caravelle. The lower compartments cannot be heated and have poor ventilation. The upper compartments are separated from the passengers only by a curtain and thus the human passengers would be likely to hear or smell their animal co-travelers. Swissair will carry no live animals other than aquarium fish in the upper compart-

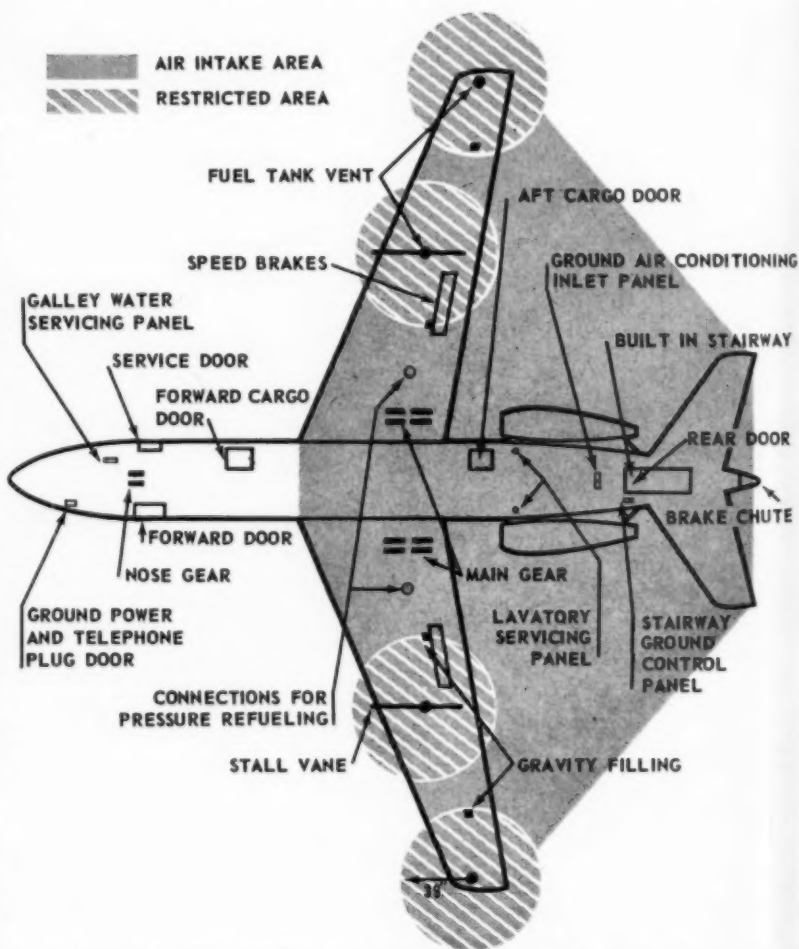


Chart shows key servicing points on the French-built twinjet for ground operations.



ments and reptiles and shellfish in the lower compartments.

Relatively little new ground equipment is needed for the Caravelle, Swissair reports. However, at the carrier's two main bases, Zurich and Geneva, some ground power units for piston-engined aircraft (28 volts dc) have been modified to meet Caravelle requirements by adding a 112 volt dc rectifier (250 amp. continuous, 600 amp. peak) at a cost of some \$2,000.

Normally, any electric ground power unit of 28/112 volts dc (250 amp. continuous, 600 amp. peak) with the same polarity as the aircraft will suffice (it should be noted that BEA's ground power units for Viscounts have opposite polarity and therefore cannot be used for the Caravelle).

Swissair is paying particular attention to ramp safety, and to the effect of noise on ramp personnel. With a continuous spectrum noise there is a risk that hearing of repeatedly exposed individuals will be weakened if noise levels exceed the limits shown below.

cps	20	75	150	300	600	1200	2400	4800
	75	150	300	600	1200	2400	4800	9600
Decibels	110	102	97	95	95	95	95	95

The high frequency noise as produced by the engine compressor extends forward from the engine inlet in

MINUTES	0	5	10	15	20	25
ARRIVAL-POWER OFF						
PASSENGER DEPLANING	5 MIN					
CABIN CLEANING			10 MIN			
PASSENGER EMPLANING				10 MIN		
LUGGAGE-CARGO OFF-LOADING		10 MIN				
LUGGAGE-CARGO ON-LOADING				15 MIN		
FOOD SERVICE			13 MIN			
WATER AND LAVATORY SERVICE		14 MIN				
CHECK OIL			3 MIN			
CHECK MISC-FLUIDS				7 MIN		
FUEL			14 MIN			
DEPARTURE-POWER ON						

Here's the play-by-play account of a Caravelle servicing operation with time allocations for 12 major steps from arrival to departure.

a band roughly 30° wide. Its impact is readily reduced by any object which obstructs the direct line of sight. The low frequency noise extends backward from the engine outlet.

Approximately 5,500 rpm is required to get a Caravelle away from standstill. This results in noise levels approximating those in the table above. Consequently, Swissair is to distribute to ramp personnel two types of ear protectors: ear plugs (reducing high frequency noise by 10 to 15 decibels) and ear muffs (cutting noise by 20 to 25 decibels).

Swissair has established that 36 mph is the maximum safe blast velocity. At frequently-used taxiing RPMs this speed is attained at a distance of 70 feet behind the engines. The blast hits the ground about 45 ft. behind the engine exhaust outlets. The effect of heat is not likely to be important. If 112 deg. F. is taken as a criterion, this temperature is attained at 70 ft. distance when the engines are running at 5,000 to 6,000 rpm. Swissair pilots are being instructed to avoid high initial engine rpms to reduce noise, blast and heat effects on ground personnel.

## Flight Operations

### United Saves Time and Fuel With Computer Jet Planning

United Air Lines has come up with an answer for one of the biggest "drag" factors in airline operations—inadequate flight planning. And what's more, actual jet operating experience is proving the answer right.

UAL uses a Bendix-built G-15 general purpose digital computer which, according to UAL's operations planning manager, T. M. Plunkett, will cut from one hour to only three minutes the time required to work out the best flight plan for a DC-8 trip.

In actual operations, the Bendix unit is saving United both valuable time and just as valuable jet fuel.

Some examples: On January 20, a UAL DC-8 was ready to depart from Chicago's O'Hare Field for San Francisco. So was a competing jet, until a "mechanical" led to its cancellation.

United had the capacity to handle the transfer passengers, but the revised payload called for a completely new flight plan to verify for certain that it could be accommodated. The problem was relayed to United's Denver operations planning center and within 12

minutes Chicago operations had both an affirmative answer and a completely new flight plan for the trip. By usual methods it would have taken an hour.

In other instances, the leased Bendix unit has saved UAL many pounds of fuel by quickly selecting best flight

plans at no sacrifice in speed. On January 13 a New York-Los Angeles nonstop was planned to make the trip in 5 hrs. 52 min. with 82,730 lbs. of jet fuel. The best a manual system could have done was 84,680 lbs. for a 5 hr. 51 min. flight.

In another instance, the computer planned a San Francisco-New York nonstop at 5 hrs. 5 min. using 72,020 lbs., whereas the best a manual plan could have done was 74,600 lbs. of fuel for the same flight time.

The computer is operated by meteorologists, "met" clerks and planning staff members at Denver. Only a few hours of training are needed to master its operation.

UAL uses the G-15 to plan all trips of jets of 1,200 miles or greater.

All data on UAL routes, distances between checkpoints, compass headings and available altitudes are stored on one set of magnetic tapes. Another contains performance data on the DC-8.

Once UAL's Denver weather center comes up with a selection of possible routes for a flight, the computer is asked to flight plan each of the possibilities. These, in turn, are given to the pilot for his final selection of the best for speed, comfort, economy and dependability.



Here are the "brains" behind United Air Lines' three-minute answer to jet flight planning, (L to R) storage unit, G-15 computer and typewriter all leased from Bendix Aviation Corp. Computer Division, Los Angeles.



## "We're Proud of Our Convair 880 Suppliers for Helping Us Meet or Beat Performance Estimates"

Says J. V. NAISH  
President, Convair Division of General Dynamics



The sleek new Convair 880, on its maiden cross-country flight from San Diego to Miami, covered the 2,338 miles in the record-shattering time of 3 hours, 31 minutes and 54 seconds. Average groundspeed was 664 mph for the trip.

As a supplier of fluid line components for the Convair 880, Aero-

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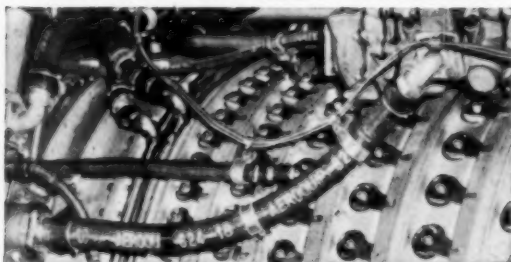
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Aeroquip's extensive product lines plus engineering experience are available to help you solve fluid system design and development problems.

Write for full information.

### AEROQUIP HOSE LINES AND MARMAN TUBE JOINTS ARE USED ON THE CONVAIR 880



Aeroquip 666 Hose of Teflon and 601 Lightweight Engine Hose are used extensively on the Convair 880's four General Electric CJ-805-3 Turbojet engines for top performance, greater dependability.



Shown above are two Marman LJ11 Joints used on the Convair 880's cabin pressure regulator. These dependable, leakproof joints are also used on the anti-icing and air start systems of the Convair 880.

Teflon is Dupont's trade name for its tetrafluoroethylene resin

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## Air-Log's Mass Sale Plan Yields Bargain Rates on Ground Units

Mass purchasing by 17 airlines has brought them savings averaging 17.8% on jet transport ground support equipment.

The equipment was purchased from Air Logistics Corp., Pasadena, Calif. One aircraft maintenance firm also took advantage of the unique "consolidated purchase" plan.

The orders represented an estimated \$600,000 in new business for Air-Log, while customer savings ranged from 6.6% to 45% per unit purchase.

The plan developed after several domestic and foreign airlines approached Air-Log with the idea following last year's technical conference in San Francisco.

Discussion there had convinced these airlines that their needs for jet ground equipment were similar. Bulk purchasing, they felt, might result in lower unit prices.

The items in question were standard Air-Log equipment—the airlines were not asking for new or special designs. Past sales had generally been based on single unit prices because a lack of airline standardization and quantity requirements placed Air-Log in the position of producing equipment orders on a semi-custom basis. The company simply could not operate as an "inventory shop" under these conditions.

Air-Log was enthusiastic about the airline proposals. Last June, the company sent a letter to all airlines explaining its plan to consolidate equipment orders and lower standard per-unit prices. The letter pointed out that with a known block of equipment orders, considerable savings could be made through larger purchases of raw materials. Airlines were given a deadline by which to place their orders.

By combining all new order purchasing and parts fabrication with existing orders, Air-Log computed new unit prices for each piece of equipment. Each airline was then advised of the total quantity purchased and the applicable quantity price. Air-Log accepted letters of intent to purchase specific items up to the deadline date, but requested receipt of a formal purchase order within the next 30 days.

One other condition was set forth in the letter to airlines. Delivery requirements were to be such that all consolidated order items could be produced during the period of October 1

to December 31, 1959, to achieve maximum economy.

If an airline took exception to Air-Log consolidated pricing, the company was willing to open its order books for audit to verify the amount of units on order and the asking price.

Together with the airline letter, the company sent three suggested equipment requirement lists as a guide to programming support equipment purchases. The suggested items and recommended amounts of each were developed from military transport experience. Included were equipment requirements for base operations involving engine removal and installation, minor repair and test; line station operations

involving primary engine and fifth pod removal and installation; and engine airlift adapter requirements to suit applicable transportation adapters and transport aircraft.

The consolidated purchase plan has been described as a "package deal." In theory, it might be. But as in the previous lack of standardization, no two carriers ordered exactly the same list of items. Nevertheless, savings were substantial as the table shows.

Over 90% of the equipment ordered was delivered by early January. Some pieces are yet to be delivered to carriers which requested an extension or a delayed delivery date.

Participants in the consolidated purchase plan included: American, Braniff, Delta, Eastern, Pan American, National, Northwest, Japan Air Lines, Japan Aircraft Maintenance Co., Ltd., Air France, SAS, KLM, Swissair, Trans-Canada, Qantas, Lufthansa, Philippine, and So. African Airways.

### What They Are Buying

Item	Model	Total Quantity Ordered	Percent of Single Unit Price Saved
Positioning Trailer	4160B	29	14.2
Transportation Trailer	3060	64	19.8
Transportation Trailer	3060A	2	NA
Transportation Trailer	3060B	18	NA
Transportation Trailer	3060C	12	10.0
Workstand—Fixed Height	3160	12	7.6
Workstand	3160A	5	20.0
Workstand	3160C	18	31.0
Monorail Yoke Hoist	4660	1	7.2
Monorail Yoke Hoist	4660A	1	6.6
Rail Aligning Fixture	2100	4	7.7
Auxiliary Power Pack	2410	4	16.2
Engine Adapter Kit-707	JT-4	42	45.0
Engine Adapter Kit-DC-8	JT-4	54	29.0
Trailer Roll-Over—60°	5060	2	NA



Air-Log's Model 4160B positioning trailer, one item in the consolidated purchase, being used to fit a fifth pod assembly to a Boeing 707.



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# Coming: Air Passenger Phone Service

*AT&T receives authority to provide nation's 'golden triangle' with a new airborne passenger convenience.*

By PHIL GERACI

WASHINGTON—Executives flying between major U.S. cities soon may be able to ring up the home office and relay en route reports with the ease of mid-city telephoning. And passengers on coast-to-coast nonstops may be calling home for little more than it costs to talk from a conventional ground-based phone booth.

A big step toward fulfillment of air to ground public radiotelephone service was taken Feb. 17 when the Federal Communications Commission granted permanent authority for AT&T to establish public air to ground operations in the 454 to 455 mc and 459 to 460 mc bands, previously (and still) allocated to domestic public land mobile telephone service. The action is effective April 1.

AT&T, denied the additional space it had requested for a full-scale program, is forced to "double up" on a service already in existence in order to keep both old and new customers happy. But the Commission action sets the stage for growth of a nationwide airborne passenger telephone system, once sufficient spectrum space is made available.

Two years ago, the Commission allocated two groups of frequencies—455 to 456 mc and 460 to 461 mc—for experimental use. The allocation initially had a year's tenure; later it received a 12-month extension.

In December, 1959, the Commission denied an AT&T petition (dated April 1, 1958) for permanent reallocation of these frequencies to air-ground public radiotelephone service, decided instead to continue the tests on frequencies a megacycle lower in bands already used by land mobile service. Officially dubious of the "public need" for a full-scale air to ground phone service, the Commission nevertheless was compelled by pressure from AT&T, NASA, ARINC and others to recognize a "limited" need for further tests.

The Commission asked for comments; they moved swiftly to set up a "permanent," though limited, program.



Northwest Airlines Photo

Hostess on Northwest Airlines plane "answers telephone" during two-year preliminary test in Chicago-Detroit area.

No doubt a significant factor in the Commission's rapid decision was unanimous acceptance—not a single negative comment was received between the date the proposal was issued and the date rule making was finalized.

With such unanimous public acclamation, it seems logical to assume that service ultimately will be expanded to cover every existing air route in the nation. But this may not be so easy to achieve. The problem hinges on the matter of providing adequate service to cope with mounting numbers of jet passengers. Will the presently-apportioned 12 channels do the job? No, in the opinion of many spectrum analysts, who suggest 40 to 60 channels.

Supporters argue that 12 channels are better than none and insist that a range of 175-plus miles from each ground station will effectively boost the potential number of simultaneous conversations. But, at the same time, they admit that the current boom in airplane building may soon outdate

even this capacity.

Radio-telephone service has existed for years in the low frequency region, the area monopolized by the maritime service. This feature was recently dramatized by El Al Israel Airlines' announcement of telephone service along all of its international routes. For \$3 to \$9 per three-minute call, El Al passengers can talk to any of several dozen ground stations scattered across the globe.

But this low frequency, amplitude-modulated "ship-to-shore" service is already woefully overburdened. Though its fingers extend much farther than the proposed UHF scheme, reception is appallingly noisy. By contrast, the new UHF system is frequency modulated and whisper quiet; talking air to ground is like talking "across the hall," in the words of one user.

After the UHF system was launched in 1957, AT&T set up test stations in Detroit and Chicago. AC Spark Plug Division of General Motors built

equipment for the purpose, leased it to airlines (Northwest, United and Capital were in on the tests) for installation.

At Northwest, the equipment was placed aboard three Boeing Stratocruisers. For two years, until the aircraft were retired, passengers flying between the two north-central cities could talk with parties anywhere in the world, as long as they were within the 175-mile radius of the two ground stations. All calls were collect; the crew handled no cash. Each call cost \$1.50 plus standard ground toll rates.

Northwest found the telephone service overwhelmingly popular. Energetic promotion helped, and the novelty of making phone calls from 25,000 ft. was no small contributor to popularity. AT&T reports that in 1959 a total of 2300 calls were made in the Detroit-Chicago area. Of these, half were made from equipment installed in commercial airliners. The rest came from executive aircraft also in on the tests.

Northwest passengers made calls from a station in the rear of the aircraft. Individual seat outlets were considered, but the idea was discarded in view of the cost. In any full-scale implementation of a permanent system, calls probably would be made directly from passengers' seats.



Here's what it takes to equip an aircraft to send and receive phone messages. AC Spark Plug Div. equipment weighs average of 30 lbs.

Capital outfitted a Viscount with equipment by AC Spark Plug Div., and a Constellation with a unit built by Bendix. But Capital's routes are flung far from the Detroit-Chicago area, and the two aircraft with telephone facilities were seldom operated within reach of ground receivers. Ultimately, the equipment was removed.

United outfitted only an executive aircraft, used the phone system sporadically, when the aircraft was under hire.

Last July and August, the Michigan and Illinois Bell Telephone Companies sought an eastward extension of their developmental authority, to New York (actually Newark), Pitts-

burgh and Washington, D.C., completing, with Chicago, the nation's "golden triangle." As things now stand, ground stations in these cities are under construction, and should be completed around the end of July.

At this early date, airlines have not been queried on the new service. AT&T will shortly circulate a general letter to airline coordinators, who will take the ball from there. AT&T doesn't feel that every airline operating over this area will install telephone equipment in every aircraft, because of cost. But the equipment will be ready when needed—both Bendix and AC Spark Plug Div. reportedly have equipment on stand-by, ready for immediate production.

AT&T spokesmen emphasize that they are not completely happy with the present state of events. Doubling up will have its problems, though channels have been shifted to minimize interference as much as possible. The company is officially on record as opposing the present limited system in favor of one utilizing a bigger hunk of the spectrum, where sufficient channels would be available for a much larger number of simultaneous conversations.

Even the FCC concedes, "It is not known at this time whether the provision for a permanent air-ground public radiotelephone service will adequately provide for growth of this service on a nationwide basis." But the Commission points to "very light" use of the land mobile band with the expectation that air-ground service will "demonstrate, through rate of growth, whether or not additional space will be required for this service."

Where would this space come from? The Commission won't—in truth, can't—say. Presumably the most likely spot would be the UHF-TV band, somewhere between 470 and 890 megacycles. Loss of a small portion of this region to another service probably would incite fewer squawks than curtailment of any other segment of the spectrum, Commission officials feel. But they are quick to point out that the Commission's "broad survey" of the frequency spectrum is far from complete, and final action on space for a full-scale air-ground public radiotelephone system is still far off.

As for the present, airlines welcome the service, even on a limited basis, as another lure to tempt elusive passengers. And Northwest's experience indicates the passengers will eat it up.

Even more receptive to the possibilities are business and executive plane owners, who see the service as a long-sought solution to the problem of how to run an office and visit out-of-town clients at the same time.

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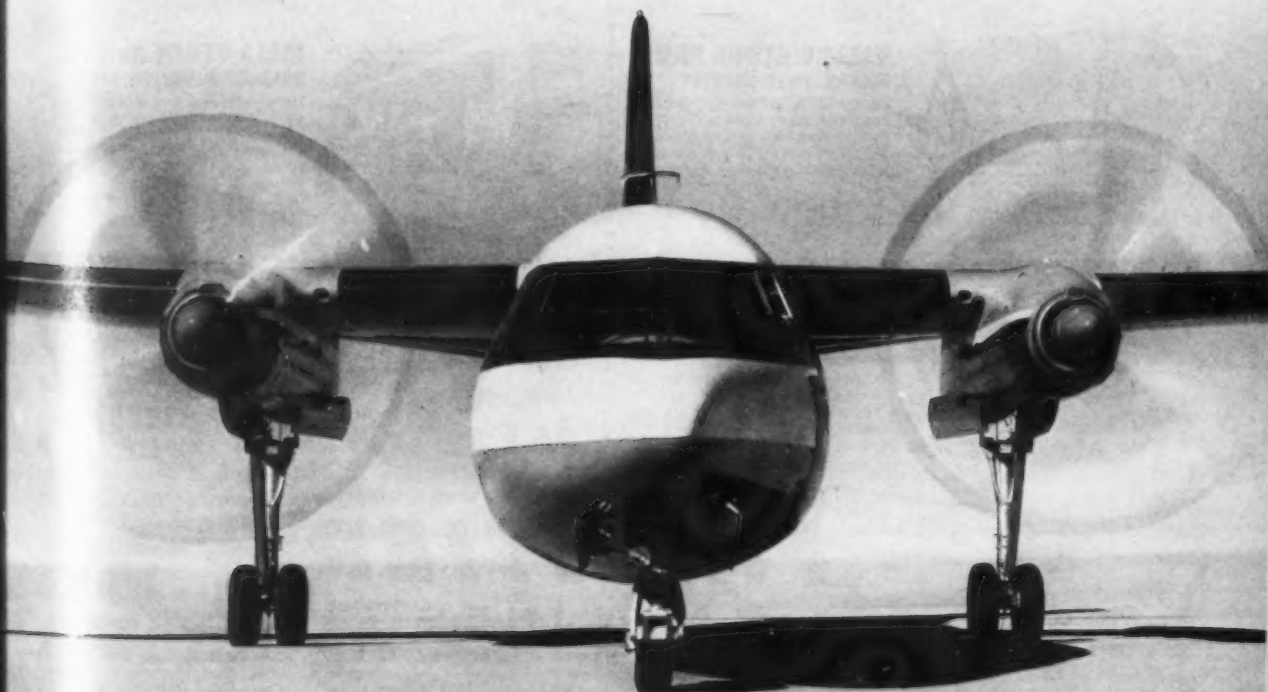
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## Stopgap to Limo Ticketing

An electronic "handwriting" system which maintains an everpresent link between a central dispatcher and two outlying stations is helping AirporTransit keep an accurate check on its passenger shuffle between Los Angeles terminals.

The TELautograph system—an electronic "notebook" that can be written on with a stylus like a ball-point pen—binds Los Angeles International Airport, which is the hub of the system, with two strategic terminal outposts.

As loaded buses depart, a baggage expeditor writes the name of the driver, number of passengers and time of departure on the TELautograph.

A facsimile copy of the expeditor's report appears on the master telescriber at LA International to help the chief dispatcher there tally the number of passengers who disembark against cash receipts turned in by the driver.

AirporTransit's assistant general

manager William J. Cutbirth, Jr. insists that a permanent, black and white record is essential to any business handling loose cash. He feels that the TELautograph is a foolproof electronic stand-in for cashiers and trip tickers.

Cutbirth realizes that some day he will have to set up cashier booths, such as are used at Detroit Airports and by Baltimore-Washington transferees. But the TELautograph has postponed this eventuality until such a move will be

profitable. This way, AirporTransit can continue to grow and maintain an essentially foolproof cash and passenger audit at the same time.

No less valuable is the data the system makes available on traffic tie-ups which delay buses making connections with other terminals. The dispatcher passes this information on to the airlines concerned.

AirporTransit serves 45 terminal points in the sprawling Los Angeles area, a passenger service touching eight separate cities. Seventeen buses and seven passenger sedans are in daily operation.

## Slipper Socks by the Million

Veteran airline purchasing official Frank Griffith, until recently director of purchases for TWA, teamed up with J. T. Yoder, manufacturers representative, to form Air Representatives, Inc., Kansas City, Mo., to sell for and service firms marketing their wares to airlines.

Already on their roster of clients are McDowell Tire Co. (Kansas City-retreads); Crimco, Inc. (also KC, galley equipment); MechniArts, Inc. (KC-food trays) and Art Textile Corp. (Highland, Ill.). A year ago last September, the latter had never produced a single slipper sock. Today it is turning out the airline giveaway novelties at the rate of a million a year.

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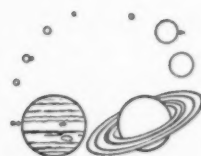
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At Douglas, life scientist research over the past ten years has explored more than *forty* basic factors relating to human survival in space. Douglas engineers are now completing — at military request — a careful survey of conditions that will be encountered en route to and on other planets. They are also evolving plans for practical space ships, space stations and moon stations in which men can live and work with security thousands of miles from their home planet.

Out of these research activities and those made by companion workers in this field has come new knowledge of great medical importance... even to those of us who are earthbound.

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## Flight Engineers Pick Flight Engineers, 4 to 1

My interest in the controversy between airline pilots and flight engineers was piqued a few days ago when I noticed the first officer and the flight engineer fighting in the aisle on a trip to Phoenix.

I at first assumed it was a routine discussion about the stewardess but since they were blocking my way to the lounge, I ventured to intervene. It was a jurisdictional dispute over operation of the coffee urn, claimed by both unions.

Since then, I have attempted to learn something more of the general conflict between these two labor groups. My first step, seeking to discover the extent of public concern over this raging dispute, was to take a poll of passengers disembarking in Los Angeles from several transcontinental airliners.

Of 307 passengers interviewed, only six were aware that their jet airliner carried more than one pilot, and 307 asked, "What's a flight engineer?"

To be completely honest, there were five who didn't know what a pilot was and one lady who kept referring to him as "the conductor." The results of the entire survey were somewhat clouded by a gentleman who thought he had arrived in Westport aboard the New Haven and was distressed because his wife wasn't there with the station wagon.

His remarks about his wife are completely unprintable. Nevertheless, I have salvaged some of the other comments which may be of interest.

"Of course, I'm in favor of three pilots in every aircraft. There are three engines, aren't there?"—Mrs. R. L. Carling, La Jolla, Calif.

"Where's the men's room buster?"—Mr. L. T. Rawlings, San Francisco, Calif.

"No jet airliner should be permitted to leave the ground without a qualified flight engineer aboard. There have been numerous incidents in which the presence of a flight engineer has saved the entire aircraft, crew and passengers from flaming destruction. I can think of at least three instances in which the captain attempted to take off without moving the throttles forward. Had not an alert flight engineer been present, one who immediately noticed the oversight and, leaning past the captain, pushed the throttles forward, those aircraft probably would never have left

the ground, incidents that would otherwise have cost the airlines involved some \$23,756.47 each, enough in itself to pay the salary of seven flight engineers for a year."—Mrs. Robert J. Tiltman, New York, N.Y. (It later was developed that Mrs. Tiltman was the wife of a flight engineer, traveling on a pass.)

"Three pilots, three pilots, I'm telling you one pilot is more than any girl should have to put up with on one of these night flights. Mr. Quesada should make all three of them stay in their seats. Look at this uniform."—Stewardess Rosalie Arrowsmith, Inglewood, Calif.

"That Rosalie, she just asks for it."—Stewardess Marlene Williams, Santa Monica, Calif.

"Two pilots is the absolute maximum required in any aircraft. The simplicity of these new jet aircraft is such that actually one pilot would be sufficient and I anticipate that new automated devices now coming into use may result in reducing his work to a monitoring function or in fact may make it possible to eliminate him from the aircraft altogether, replacing him with a flight engineer."—Mr. Clarence L. Sayen, Washington, D.C.

(It took two weeks of hard research and several rather embarrassing phone calls to uncover the fact that Mr. Sayen is the owner of a retail men's clothing store on 14th St. and that this was his first trip by air.)

"Please, mister, where's the men's room?"—Mr. L. T. Rawlings, San Francisco, Calif.

"I honestly think the problem will be solved when the Caravelle is assigned to the Los Angeles-New York route," Mr. W. A. Patterson, Chicago, Ill.

"Yes, I'm an aircraft engineer and I think a flight engineer is a must on every jet. We had a swinging flight engineer's panel on the 707, you know, so that it could be flown by two pilots without a flight engineer. Didn't work. Every time the plane banked, panels swung around, banged the first officer on the head. Seven of them were knocked unconscious. In one case, it was as long as six hours before the captain noticed. We believe now a flight engineer is absolutely necessary to let the captain know if the first officer is conscious. In addition, he has to hold the panel.—Mr. William S. Gordons, Seattle, Wash.

"I don't think flight engineers or pilots are necessary to run a good airline. I'm not even sure you need aircraft."—Mr. Howard Hughes, Las Vegas.

"I thought the girls flew it."—Mrs. T. B. Sawkin, Sweetwater, Tex.

"Mister, for heaven sake's, where is that men's room? It was a long flight all the way across the country. Why didn't I go on the plane? I'll tell you why I didn't go on the plane. I couldn't, that's why. Those pilots keep relieving each other just like Mr. Quesada says they can do. But they say I belong to the wrong union. I can still hear it ringing in my ears, that fiendish laughter. FAA regulations say I have to stay in my seat. I'm the flight engineer. Hurry."—Mr. L. T. Rawlings, San Francisco.



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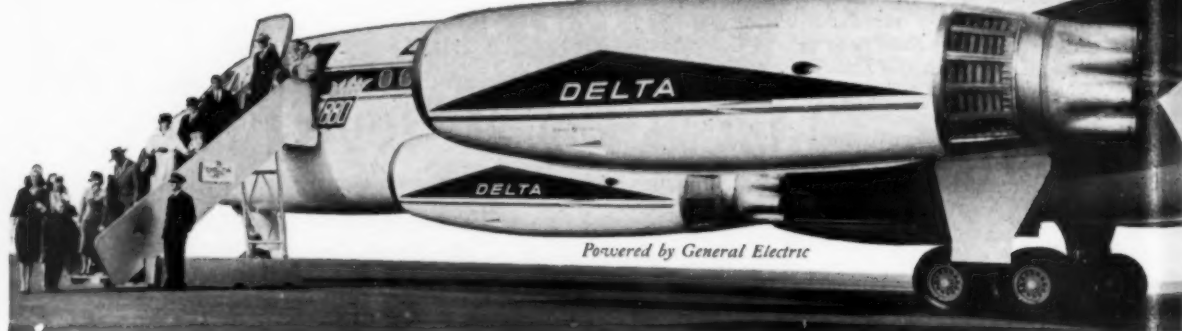


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## IN THE AIRLINES

**Nelson B. Fry**, 25-year veteran in the industry, resigned as v.p.-traffic and sales of Northeast to become v.p.-sales and service of Allegheny, as the local service line realigned its management for expanded operations. He takes over sales and advertising from senior v.p. **David L. Miller** and stations from **Richard G. Dinning**, formerly v.p.-flight and stations, now v.p.-flight. Miller will handle community and public relations, state and federal affairs and properties. **Edwin I. Colodny**, former secretary and asst. to the president, becomes v.p.-legal affairs and economic research.



FRY



ARNOLD

**Leslie P. "Les" Arnold**, v.p.-properties and leases of Eastern, who completed 20 years of service with the company on Mar. 1, will retire July 1. Well known in the industry, Arnold was one of the group of four Army pilots who completed the first round-the-world flight in 1924.

**George E. Hatch**, western region sales mgr. for Northwest for the past 10 years, elected v.p.-sales of West Coast Airlines, a position which has been vacant.

**J. Gordon Bennett**, who has been special asst. to FAA Administrator Quesada since establishment of the agency, named director of advance schedule development for American.

**John J. Ludwigsen**, who has been with Wright Aeronautical for over 20 years, resigned as the company's service mgr. to become Eastern's director of jet engine overhaul.

Appointments have been made in Eastern's new customer services department, under v.p. **R. L. Turner (AIRLIFT, Mar.)**. **Frank Sharpe** is now asst. v.p.-customer services mgr. **Frank Williams** becomes asst. v.p.-asst. customer services mgr., and **Jim Baldridge** is supt. of cabin customer services.

**Lord Douglas of Kirtleside** reappointed chairman of British European Airways for two years.

**Charles E. Beard**, president of Braniff, decorated with the Order of Balboa, the Republic of Panama's highest civilian honor. Award was for Beard's contributions toward furthering goodwill between the Americas through development of international aviation.

Agency and interline division of Northwest was reorganized into separate sections. **Jack Keillor**, 12-year veteran with NWA, is mgr. of agency sales, while 16-year veteran **David Cleary** handles interline sales.

**Robert E. Keller**, Western's chief reservations agent in San Francisco, appointed to newly created post of reserva-

tions standards mgr., based at Los Angeles headquarters.

**Dan O. Rush**, former pilot for United, Pan American and Flying Tigers, named chief pilot for Lone Star Airlines, operating intrastate Dallas-Houston service.

**Eddie Holohan**, charter sales mgr. of Flying Tigers, named mgr. of military and international affairs, based in Washington.

**Jack Hiller Jr.** named to newly created position of mgr. of cargo, military and government sales for Allegheny. He has been sales mgr. for Washington-Baltimore areas.

**L. Orville Cameron** elected asst. v.p. of Eastern, reporting to **M. M. Frost**, v.p. and executive asst. to the board chairman. He has been asst. to Frost.

**Erik Fris**, president of several Swedish investment trusts, elected a director of SAS, filling the vacancy created by the recent death of **Edwin Chinlund**.



YAWN



KERSEY

**Archie D. Yawn** promoted from general sales mgr. of Southern to director of advertising and sales development.

**Malcolm McDonald**, former agency and interline sales mgr. of Pan American's Pacific-Alaska division, joined South Pacific Air Lines as sales mgr.

**John R. Kersey**, former dining service mgr. of United in Chicago, joined Continental as director-in-flight services.

**Bruce M. Ryan** promoted from regional sales mgr. of Bonanza in Arizona to director of public affairs, based in Phoenix. **Robert T. Czerny**, Utah sales mgr., takes over Ryan's former post.

**Paul Bewshea**, sales adviser to BOAC's mgr. in the U.S., appointed to additional post of mgr. of island services, responsible for development of services between New York and Bermuda, Nassau and Jamaica.

**Alfred M. Hudson** resigned as asst. to the president of Princess Hotel of Bermuda to become asst. to **Harold Graham**, president of Eagle Airways. Several years ago, Hudson was senior v.p. of Colonial, before its acquisition by Eastern.

**Mario Furnari**, formerly with Air Express International, named international division mgr. of Riddle.

## AMONG THE SUPPLIERS

**V. B. Benfer**, president of PacAero Engineering Corp. since it became a wholly-owned subsidiary of Pacific Air-motive in 1956, elected v.p.-development of the parent company. **James L. Fechter**, former v.p. and gen. mgr. of Southern California Aircraft Corp., becomes PacAero president.

**Earl D. Hilburn**, former v.p. of Link, elected president and chief executive officer of Burton-Rodgers Inc., producers of technical training devices. He succeeds **Paul C. Rodgers**, who becomes executive committee chairman.

**Harold H. Dice** elected a v.p. of General Motors and named gen. mgr. of the Allison Division, succeeding **E. B. Newell**, who retired Mar. 1. Dice, with GM over 30 years, has been asst. gen. mgr. of Allison for seven years.



DICE



GOSSETT

**Allison E. Gossett** promoted from asst. director to director of aviation sales of AC Spark Plug Division of General Motors. **Donald R. Jahn** advanced from junior advertising and sales promotion specialist to aviation sales merchandising mgr.

**William A. Matthews**, formerly with Sperry Gyroscope, named works mgr. of Kollsman Instrument Corp.

**R. J. Pfeiffer**, who has been marketing

## AIRLIFT Publisher Honored

**Wayne W. Parrish**, president and publisher of *AIRLIFT*, received the Frank M. Hawks Memorial Award for his contributions to the development of aviation from Air Service Post 501, American Legion, at a dinner at the Lotos Club in New York. Shown above, prior to the presentation, are, left to right, Roy Hurley, board chairman of Curtiss-Wright Corp.; Mr. Parrish; Vice Adm. C. E. Rosendahl (USN, Ret.), and Harry Bruno, head of H. A. Bruno & Associates, a founder of the post.



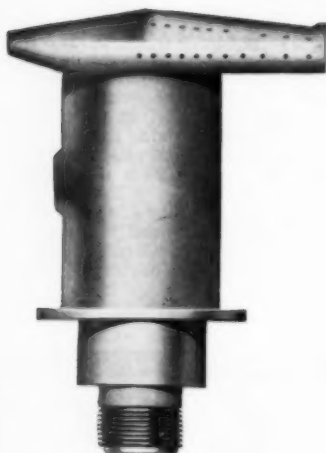
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- To calculate true airspeed (in combination with Mach number) for air navigation.
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## ABOUT PEOPLE

mgr. for North American Aviation, named mgr. of commercial aircraft marketing activities at the Los Angeles division. He is conducting market surveys to determine sales potential of twin-jet T-39 Sabreliner and supersonic transport development of the B-70.

**Roy N. Carlson** appointed aircraft service mgr. of Bendix Products Division of Bendix Aviation Corp., succeeding **J. D. Gibboney**, who will serve on the staff of the gen. mgr.-aircraft.

**Warren Murdock** named mgr. of sales planning and marketing research for The Garrett Corp.

European appointments announced by Lear Inc.: **Fernand H. Matile**, director of European sales, based in Geneva; **Wayne E. Burkland**, director of European service, Munich.

**J. S. Farra**, former director of service, named director of domestic commercial



FARRA



DAVIS

sales of Douglas Aircraft, succeeding **J. O. Moxness**, who heads a new commercial sales office in New York. **W. S. Fryer** appointed director of product support, combining his former function as director of parts sales and publications with that of director of service vacated by Farra.

**Frank F. Davis**, former domestic commercial sales mgr. of Lockheed, named director of all commercial aircraft sales, including Electra export sales. **T. F. Bergmann**, export commercial sales mgr., appointed to new post of asst. director of commercial aircraft sales.

## OTHERS IN AVIATION

**Chester J. Jump**, Railway Express Agency's v.p.-administration and finance since 1953, appointed to new post of senior v.p. Jump is co-chairman of the REA-airline joint committee for air express.

**John Lundmark**, asst. v.p.-traffic of Air Transport Assn., also named executive secretary of Air Traffic Conference.

**Charles W. Rinka**, formerly with Pan American, named gen. traffic mgr. for air freight for American Express' foreign traffic dept.

## IN THE AGENCIES

**Joseph D. Blatt**, who has been acting mgr. of FAA's New York regional office, appointed deputy director of the Bureau of Facilities and Materiel in Washington.

**John B. (Jack) Jaynes**, 32-year veteran with FAA and CAA, retired as deputy regional mgr. of FAA's Region II, Ft. Worth. He was one of the first six air carrier inspectors, and one of the authors of the original Civil Air Regulations.

**Dr. Robert T. Clark**, formerly of USAF's Aerospace Medical Center, named deputy director of FAA's Aeromedical Research Institute, Oklahoma City.

# NOW! ONE-AIRLINE SERVICE TO HAWAII ONLY ON UNITED AIR LINES



United Air Lines Jet Mainliner®—already linking major U. S. cities coast to coast—now offers new jet speed and comfort to Hawaii. This means that you can offer your passengers one-airline jet service to the enchanting Islands . . . with United's *extra care*.

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## Expansion of Central's System Recommended

Expansion of Central Airlines' system, particularly in the area from Denver to Wichita, Topeka and Kansas City, was recommended by CAB examiner Joseph L. Fitzmaurice in initial decision in the Kansas-Oklahoma Local Service Case.

In this area, Central would take over a number of points now served by Continental. The examiner did not favor Central for Little Rock-Memphis and Kansas City-Memphis routes which it sought.

He recommended amendment of Central's certificate to authorize service between Kansas City and Topeka and (1) beyond Topeka to Denver via Manhattan/Junction City/Ft. Riley, Salina, Hays and Goodland, and (2) beyond Topeka to Wichita and Hutchinson, Kan., and (a) beyond Hutchinson to Denver via Great Bend, Dodge City and Garden City, Kan., Lamar, Pueblo and Colorado Springs, Colo., and (b) beyond Hutchinson to Denver via Salina and Goodland. Authority to

serve Kansas City, Topeka, Wichita, Colorado Springs and Denver should be permanent, other points for five years, he said.

A realignment of segments would enable Central to operate from Amarillo through Borger to Oklahoma City, and beyond Liberal to Denver via Pueblo and Colorado Springs. It would receive Oklahoma City-Stillwater-Tulsa-Joplin-Springfield, Mo. Another modified segment is Tulsa-Fayetteville-Ft. Smith-Hot Springs-Little Rock, and a new segment would be Kansas City via Topeka and Independence/Coffeyville/-Parsons to Bartlesville, and beyond Bartlesville to (1) Oklahoma City and (2) Tulsa.

Ozark Air Lines was recommended for St. Louis-Ft. Leonard Wood for five years, but denied Kansas City-Memphis. Fitzmaurice said Ozark should be eliminated at Pittsburg, Chanute and Wichita, Kan., but not at Springfield or Joplin, Mo., and should be certificated at Sedalia, Mo., for three years.

Continental, dropping the smaller points to be taken over by Central, would serve Denver-Colorado Springs-

Kansas City, Denver-Colorado Springs-Wichita-Tulsa, and Tulsa-Kansas City.

## ROUNDUP OF ACTIONS

**Examiner James S. Keith** recommended the following in an expedited portion of the Piedmont Local Service Area Investigation: Lake Central's segment 7 should be extended from Terre Haute to Evansville, and a Cincinnati-Evansville segment added. Allegheny favored for segment 5 extension from Huntington, W.Va., to Nashville via Lexington, Frankfort and Bowling Green. Ozark renewed at Louisville and Clarksville/Ft. Campbell/Hopkinsville permanently and at Owensboro for five years.

**CAB reopened** the Ft. Worth Adequacy of Service Investigation after the Texas city complained that Ft. Worth-New York/Washington service has deteriorated since CAB decisions in the case.

**Cie. de Transports Aeriens Intercontinentaux (TAI)**, French independent, should receive a foreign air carrier permit between Noumea, New Caledonia, and Los Angeles via Papeete, Tahiti, Bora-Bora, French Polynesia, and Honolulu, examiner Barron Fredericks recommended. TAI will start weekly DC-7C service in May, will put a DC-8 on the route later.

**Trunklines were allowed** to extend passenger fares, due to expire Mar. 31, to June 30, to maintain status quo until decision in General Passenger Fare Investigation.

**Air France received** amended permit to operate between France and Anchorage, Alaska, via Hamburg, Germany. AF can fly between Anchorage and Tokyo any planes operated France-Anchorage, but can't pick up or discharge traffic at Anchorage on such flights.

**Lufthansa's permit** should be amended to include service between Germany and San Francisco via Brussels, Paris, Manchester, Shannon, Toronto and other Canadian points, examiner F. W. Brown said. Route is provided in U.S.-Germany bilateral.

**CAB suspended** and will investigate Pan American's plan to raise New York-San Juan thrift fare from \$45 to \$52.50.

**CAB will investigate**, but not suspend, Capital's proposed summer festival excursion fares to New York, planned for July 7 to Sept. 1.

**Pan American and TWA given** exemption to provide transatlantic service from Baltimore. Authority is good until 90 days after CAB decision on their applications for certificates to perform the same service.

**Continued suspension** of service at Boston by Riddle Airlines authorized by CAB. Riddle said it will resume demand service at Cincinnati and Jacksonville.

## MAIL RATES

**Allegheny Airlines** requested an additional \$1,267,026 temporary mail pay for the period Apr. 1, 1955 through Dec. 31, 1959. It also requested a \$3,620,116 rate for year started Jan. 1, 1960. Company now receives \$2,537,000 annually.

**Piedmont asked** temporary rate of \$4,346,376 for year started Jan. 1, 1960. Last rate order set pay at \$3,019,418 for year started July 1, 1959.

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Rejuvenated German carrier gears for jets with maintenance at Frankfurt, overhaul at Hamburg

## Lufthansa Adopts Two-Base Concept

FRANKFURT, GERMANY—It has been only five years this month since Lufthansa went back into operation. Prior to 1940 it was one of Europe's foremost airlines, but the German carrier was forced to shut down completely from 1945 to 1955. When it resumed operations it was but a shadow of the organization that it had been in its peak year—1939.

With a route network stretching much of the way round the world, a fleet of aircraft second to none and highly satisfactory load factors, Lufthansa should be in good shape in 1960. But few international airlines have the problems that Lufthansa has to face. Money is a big one. Rebuilding from scratch has been costly and the carrier won't move into the black before 1961.

The planning for re-establishment of Lufthansa was done in Cologne and this city, near to West Germany's capital of Bonn, remains today the head

office. The overhaul base for the revived airline was established in Hamburg, mainly as a result of an early offer by local authorities to build a facility for it.

### Frankfurt is jet center

The main center of operations in Germany since the war has been Frankfurt which, by its geographical position alone, is a logical cross roads. As jet operations approached it became clear that several German airports were not going to be suitable for non-stop flights to New York until long after Boeing 707s were delivered. Hamburg had one of these facilities. For this reason, Lufthansa decided to take advantage of an offer to build a jet base for it at Frankfurt's Rhein/Main airport, which is big enough for the 707 to take off on non-stops to New York.

This decision, naturally, did not enchant the city fathers of Hamburg,

particularly since they had agreed to build a second hangar for Lufthansa there. But they were pacified when the airline made it clear that Frankfurt would be used only for maintenance and that all overhaul work would continue to be performed at Hamburg.

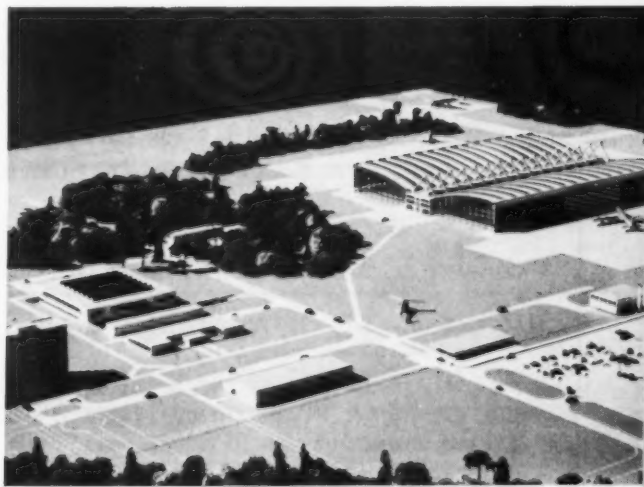
The second 660-foot long hangar at Hamburg has just been taken into use. Under construction next door is a special hangar for engine run-ups. Each of Lufthansa's aircraft types will fit into this hangar, provided with special sound-damping and ventilation facilities.

The Hamburg base does all airframe and engine overhaul work. It currently overhauls Pratt and Whitney R-2800s, Wright R-3350 turbo compounds and Rolls-Royce Darts. Current overhaul life for the R-2800 is 1500 hours; R-3350 turbo compound, 1500 hours (going up shortly to 1600); and Dart, 1700 hours.

The Lufthansa test cell, built by



Lufthansa's overhaul base at Hamburg.



Frankfurt, location of Lufthansa's maintenance shops.

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## The current Edition of **WORLD AVIATION DIRECTORY** including **MISSILE/SPACE industries** Is Now Out of Print

The 6,500 copies of the Fall-Winter, 1960 Edition of the **WORLD AVIATION DIRECTORY**, including **MISSILE/SPACE industries** are gone. This sell-out occurred within 4 months after the present edition came off press. Requests are still coming in for this ever-increasingly valuable reference source. If you ordered copies and received an "Out-of-Print" notice, forgive the inconvenience.

The next edition of this one-and-only **WORLD AVIATION DIRECTORY** is being prepared right now. Our large editorial staff is busy compiling the latest data to completely revise the Summer, 1960 Edition. You'll be getting your Directories in June. Place your order now and avoid disappointment. Copies will be placed on reservation, in your name, as soon as order is received. Send in purchase order or use the handy order form below.

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Grunzweis and Hartmann, is used to test both piston engines and turboprops. It can be converted from one type to another in half an hour. Initially, Lufthansa will send the Rolls-Royce Conways from its 707s back to the engine manufacturer's headquarters at Derby for overhauls. The program for the P&W JT3D in the 720Bs has not yet been decided but it is likely that Lufthansa will do the work itself. Lufthansa has four 720Bs on order.

### Six aircraft types

Most of the 1500 workers in the Hamburg shops are engaged in caring for the airframes of the six types of aircraft currently used by Lufthansa—Boeing 707 (five on order—two delivered), Lockheed L-1649 (four in service), Super Constellation (seven), Vickers Viscount (nine), Convair 440 (nine), and Douglas DC-3 (three). The shops also take care of Convair 240s of Deutscher Flugdienst, a non-scheduled airline owned 95% by Lufthansa.

Major overhauls are done on these aircraft at the following intervals: 707, 2500 hours; L-1649/Super Constellation, 3700 hours; Viscount, 3000 hours; Convair 440, 2950 hours; and DC-3, 1275 hours.

At Frankfurt, a double hangar capable of accommodating six 707s is the main feature of a \$7 million complex of buildings just constructed for Lufthansa's use. Included is the system flight kitchen, probably the most elaborate of its kind in the world.

Lufthansa works very closely with German industry to develop new equipment. It is buying for its 707s three Deutz tractors made in West Berlin. Cost: \$2,000 each. From Brown Boveri of Ludwigshafen, it is buying four ground power generators. Hapla of Utersen is supplying four compressed air starters on Volkswagen chassis. A special freight loading vehicle for the 707 has been developed by Bumag. Krefeld. Lufthansa has ordered three.

Galley equipment manufactured by Sell of Herborn is standard in the Lufthansa 707s, L-1649s, Super Constables and Viscounts. Seats for certain types of aircraft have come from Hamburger Flugzeugbau of Hamburg although for the 707s it is using seats made by a French company, Sicmar.

When will Lufthansa go back to the German aircraft industry as its main supplier of transport aircraft? The answer is probably never. Although inventive German aircraft designers have come up with some interesting paper transports, production of them could only come from a German government-subsidized program—and the German Transport Minister has said he is not prepared to support this.



## Auto Scrubber Mechanizes Ramp Cleaning

By FRANCIS A. BOLTON

Aviation Supt., Port Columbus, Ohio

The tracking of oil, dripped onto loading ramps by aircraft engines, through the passenger compartments of transport aircraft costs the airlines a tidy sum in cleaning bills and presents a major problem for airport managers.

The 54-inch-wide center carpet on the DC-8 costs Eastern Air Lines \$17 a yard. Tracking oil onto this carpet is like wasting money. And keeping a modern jet transport out of service, even for the short time required to clean carpets and seat covers, can add up to considerable expense.

Airlines have fought this problem a number of ways. Here is what O. T. Larson, vp-ground services of United Air Lines, has to say about the problem:

"During loading of passengers, we use a 36-inch by 38-inch removable carpet in the entrance of the aircraft to serve as a sort of door-mat. Under extreme conditions, we also use a paper aisle runner in the aircraft to cover the rugs during loading. As an additional precaution, we install these runners whenever our flights terminate.

"On our Red Carpet service we use a runner from the gate to the airport, but this is not done on other flights. The aircraft aisle runners are spot-cleaned on every terminating flight and a thorough cleaning is given during 150-hour maintenance checks."

That covers the situation inside the airplane. What about the problem outside?

Ground crews slip and slide in spilled oil as if they were walking on ice, creating a safety hazard. Passengers also are in danger of falling, especially women in high heels. Ramp markings disappear and planes may miss their proper parking position. This can create delays during busy hours of the day.

At Port Columbus, we attacked the sludge problem with a Lincoln Industrial Auto-Scrubber and with Oakite "Aero-Det," a detergent manufactured in Dayton.

The 60-inch auto scrubber was delivered on the first of March in 1959. Our experience since that time has indicated that regular ramp cleaning with the Auto-Scrubber pays big dividends.

Here's how our monthly costs break down.

Scrubber <sup>1</sup> .....	68.33
Detergent <sup>2</sup> .....	275.00
Labor <sup>3</sup> .....	179.20
Brushes .....	40.00
Maintenance, gas, oil ..	24.00
<b>Total .....</b>	<b>586.53</b>

<sup>1</sup>Original cost \$8200, depreciated over 10 years.

<sup>2</sup>Monthly average: 2½ barrels at \$110 per barrel.

<sup>3</sup>Four men, at \$2.80 per hr., 8 hr. shift.

We've broken this down to the seven



Ramp Scrubber leaves detergent design on Port Columbus, Ohio apron as it washes away spilled grease, oil and grime.

airlines serving the terminal on the assumption that four-engine aircraft would create 60 per cent of the sludge and two-engine aircraft 40% if there were an equal number of each.

The pro-rated cost ranges from \$241.41 for the busiest airline (477 four-engine flights and 488 twin-engine flights per month) to \$13.14 for the line with 86 twin-engine flights per month.

Total cost to the airlines is \$513.20 a month, assuming that weather conditions will prevent four scheduled cleanings per year.

We use the power scrubber at night so that all gate positions can be completed without delay and so that the detergent can be left on the ramp for at

least half an hour. This soaking is one of the secrets of effective cleaning.

The Lincoln Auto-Scrubber removes most of the detergent and water itself, and the excess is washed away with a four-inch fire hose.

Removal of detergent and water by the scrubbing machine itself cuts down on the drainage problem and means that dirt will not be carried from one gate position to another during the drying period.

We have found no cheaper method of keeping oil off ramps. Furthermore, when the scrubber isn't busy on the ramps, we find that occasional cleanings of taxicab stands and parking lots is helpful.

Write: Dept. A/L, American Lincoln Corp., 518 South St. Clair St., Toledo, Ohio.

### NEW PRODUCTS

#### Jet Loading Stands

Seven self-propelled passenger loading stands are being brought into use by Swissair as part of its jet program that starts this spring. Gebrueder Frech of Sissach, Switzerland, builds the stands to a design of Swissair. Unit cost of each stand is about \$7,000.

Propulsion is provided by a hydraulic

system powered by a Volkswagen motor. The driver sits at the front left hand corner underneath the platform and can maneuver the stand with the greatest of precision—the front wheels turn through 90 degrees.

The stand can move forward or backward at 5 mph. Weighing 10,600 pounds the stand is 33 feet long and 12 feet wide. The platform can be raised to a



# THE NEW PURITAN *sweep-on* OXYGEN MASK FOR JET CREWS



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## INFO FOR THE ASKING

**Airport operators**—Be sure to request Airport Operators Council's new brochure outlining its revised dues structure, membership services and present members.

Write: Dept. A/L, AOC, 1700 K St., N.W., Washington 6.

**Ground starters**—Brochure from Pre-Flite Industries Corp. covers line of ground starting equipment for aircraft.

Write: Dept. A/L, Pre-Flite Industries Corp., 18118 South Broadway, Gardena, California.

**DC-3**—Bulletin on William C. Wold Associates' Skyrama DC-3 describes specialized treatment of an old standby.

Write: Dept. A/L, William C. Wold Associates, 551 Fifth Avenue, New York 17, N.Y.

**Joint design**—Design information catalog on aircraft tubing and duct joints, covers wide range of sizes.

Write: Dept. A/L, Advertising Dept., Aeroquip Corp., Marman Div., 11214 Exposition Blvd., Los Angeles 64.

## NOTES ABOUT SUPPLIERS

• Howe Sound Co. has acquired Triplett & Barton, Inc., Burbank, Calif., producer of x-ray for aircraft inspection (used by TWA). T&B products will be distributed by Sperry Products Co., Danbury, Conn., also a division of Howe Sound.

• Napier Engines, Inc., named William C. Wold Associates, New York, as executive transport sales agents in the U.S. and Central America for Eland-powered Convair 540s. B. J. Vierling, Aircraft Supply Co., Washington, retains airline sales representation.

• Southwest Airmotive Co., Love Field, Dallas has been appointed distributor for Eveready aircraft products, will operate from warehouses in Dallas, Houston, St. Louis, Kansas City and Denver.

• D. Napier & Son Ltd., British specialists in non-transparent de-icing protection for aircraft, will expand to transparent field following signing of agreement with Sierracin Corp., Burbank, Calif.

Solution to Cockpit Quiz: Top, 880; center, DC-8; bottom, 707.



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## Enigmatic Ex-Russian Bosses Nepal's Fabulous Hotel Royal

The pride and joy of Kathmandu, the capital of Nepal, is the Hotel Royal. It is the one hotel throughout the world that is entitled to its name, for the hotel is a former palace of the Rana family that ruled the country for generations until 1954. So if you've ever yearned to stake out in a real palace, this is it, except don't expect too much from a palace in a country that was isolated from the rest of the world until 1955.

The hotel is operated by a brash, hard-bitten Russian exile by the name of Boris Lissanevitch whose history is about as legendary and turbulent as any guy now living. He has a statuesque blonde Danish wife some years younger than his own age in the fifties. How and why he left Odessa on the Black Sea is not known, but at some point Boris ended up in Calcutta and operated for years there the Indian city's plushiest night club. If steaks and liquor were in short supply elsewhere, Boris always had them in his night spot.

Along with other of the elite in Nepal, the King used to slip incognito into Calcutta for a round of fun from time to time. He and Boris became good friends. How and why Boris left Calcutta isn't known, but at any rate he turned up in Kathmandu some years ago. One thing led to another, and Boris obtained the use of one of the old Rana palaces to operate as a hotel.

Considering his problems, Boris has turned in an extraordinary performance. When I was there late in 1958, he had some forty rooms equipped with bath. The number is now higher. All of the bathroom equipment—mine was green, no less—had been flown in from India. Just how the palace had been equipped before Boris took over, I couldn't learn, but modern plumbing was never one of Nepal's great assets and still is a rarity. Sewage systems are considered to be something quite unnecessary in a country that uses human waste as fertilizer for crops, and there are still many such areas of the world where this is true.

The palace is a big, old rambling structure. Most of the rooms are enormous. High ceilings, a huge room for the bath with fixtures far apart, and enough space in the bedroom for a ball. But the rooms are clean and the room boys are available at a second's notice.

The dining room isn't anything to brag about. It's spartan, as is the food. But you can get by. There is only one choice on the menu. An extraordinary feature is that there is food service 24 hours a day. Like everything else in Kathmandu, nothing fits a pattern, including social life. Boris may want food at 3 a.m., so the kitchen is open.

When I was there, Boris was beginning to fix up a bar and lounge that was to set a world record in decor. He was gathering old hand-made bricks for a



Boris, who operates the Hotel Royal, shown in center writing out instructions for a Land Rover (similar to a Jeep) trip east of Kathmandu. At left is Mrs. WWP. Next to Boris is S. Ralph Cohen, of IATA, and at right is the Nepalese driver and guide who works for the U.S. mission in Nepal.

big fireplace. The bar was to be constructed of centuries-old wood carvings taken from temples or old mansions. Back of the lounge he was planning to build a white-tiled kitchen, completely modern, and without a doubt the finest in the country. I've wondered how this has progressed. What was to be done in three months, in Nepal usually takes a year or two.

At the time of my visit there was no whiskey available, but Boris told me he had just received word that some hundreds of cases of liquor stock had arrived in Calcutta. What with payoffs, pilferage and breakage on the long haul through customs and terrain to Kathmandu, I wonder how much of the stuff finally reached the hotel.

When I was there Boris was out of

jail temporarily. He lands in the jail quite often but it's a comfortable, cozy situation. His wife and friends visit him, he gets his own food from the hotel, and it's just part of the way of life in Nepal.

The situation at the moment was simply that the hotel cook was caught killing some chickens on a religious holiday (of which there are hundreds) when chickens were not to be killed. The cook, a Swiss, was unaware of his crime. But he was hauled off to the brig before noon just when luncheon for the hotel guests was being prepared. Not only that, but the police took all the cooked food along with the cook.

Boris met the situation handsomely. He found some cold chicken elsewhere and arranged to serve the guests. Then he went to a high government official to pull some strings and finally got the cook released on the promise that he, Boris, would serve the sentence in jail. Managers can be spared, but not cooks. Boris also got an official release of the food, but when he sent a truck for it, the police told him the food had to be destroyed as "unfit for human consumption," another way of saying that the police force had enjoyed their meal enormously but there wasn't anything left.

So Boris began serving time and his Danish wife continued to operate the hotel. But a foreign dignitary had arrived in Kathmandu as a guest of the King. The King is a great soccer fan and announced that he would have a soccer match in honor of the guest. But one of the King's aides told the King that this was impossible. Why, asked the King. Because Boris was in jail, and Boris was captain of one of the soccer teams which couldn't play without him. Why was Boris in jail again, the King asked. Told the reason, the King ordered that Boris be released at least until the soccer game was held.

And so he was. And when I was there, Boris was still out of jail temporarily, waiting for somebody to take him back again if anybody in the police establishment got around to remembering that the cook's sentence hadn't been fulfilled.

If you don't believe this, find a book called "The Mountain is Young" by an Eurasian girl by the name of Han Suyin. There are American and British editions. In the book Boris and his wife are disguised ever so slightly as Vassili and Hilde. Boris' many experiences are detailed as well as a great many other unbelievable things that have been going on in that fabulous little kingdom of Nepal.



The Hotel Royal, an old palace, the haven of visitors to Nepal.

Photos by WWP.



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